



**BUSINESS  
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# **BEA Architecture Product Guide**

**March 13, 2009**

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# Table of Contents

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<b>Version History</b> .....	<b>i</b>
<b>Table of Contents</b> .....	<b>ii</b>
<b>Index of Figures</b> .....	<b>viii</b>
<b>Index of Tables</b> .....	<b>viii</b>
<b>Acronym List</b> .....	<b>ix</b>
<b>1 Introduction</b> .....	<b>1</b>
1.1 Purpose and Scope .....	1
1.2 Relationship to Other Documents.....	1
<b>2 Key Concepts</b> .....	<b>2</b>
2.1 DoD Architecture Framework Architecture conventions .....	2
2.1.1 All View .....	2
2.1.2 Operational View .....	3
2.1.3 Systems and Services View.....	3
2.1.4 Technical Standards View .....	3
<b>3 AV-1 – Overview and Summary Information</b> .....	<b>4</b>
3.1 Summary Description .....	4
3.1.1 Product Purpose.....	4
3.1.2 Product Structure .....	4
3.1.3 Relationship to Other BEA Products .....	4
3.1.4 AV-1 Product Definitions.....	4
3.2 Developing the AV-1 Product.....	4
3.2.1 Pre-Development Tasks .....	4
3.2.2 Development Tasks .....	5
3.2.3 Post-Development Tasks .....	5
<b>4 AV-2 – Integrated Dictionary</b> .....	<b>6</b>
4.1 Summary Description .....	6
4.1.1 Product Purpose.....	6
4.1.2 Product Structure .....	6
4.1.3 Relationship to Other BEA Products .....	7
4.1.4 AV-2 Product Definitions.....	7
4.2 Developing the AV-2 Product.....	7
4.2.1 Pre-Development Tasks .....	7
4.2.2 Development Tasks .....	7
4.2.3 Post-Development Tasks .....	9
4.3 Modeling the AV-2 Product Using SA .....	9
4.3.1 AV-2 Modeling Conventions .....	9

4.3.2	Modeling AV-2 Objects .....	9
4.3.3	AV-2 Best Practices .....	10
<b>5</b>	<b>OV-5 – Operational Activity Model .....</b>	<b>11</b>
5.1	Summary Description .....	11
5.1.1	Product Purpose .....	11
5.1.2	Product Structure .....	11
5.1.3	Relationship to Other BEA Products .....	14
5.1.4	OV-5 Definitions .....	15
5.2	Developing OV-5 Models .....	16
5.2.1	Pre-Development Tasks .....	17
5.2.2	Development Tasks .....	17
5.2.3	Post-Development Tasks .....	22
5.3	Modeling the OV-5 Product Using SA .....	22
5.3.1	OV-5 Modeling Conventions .....	22
5.3.2	Modeling OV-5 Objects .....	25
5.3.3	OV-5 Best Practices .....	29
<b>6</b>	<b>OV-6a – Operational Rules Model .....</b>	<b>31</b>
6.1	Summary Description .....	31
6.1.1	Product Purpose .....	31
6.1.2	Product Structure .....	32
6.1.3	Relationship to Other BEA Products .....	32
6.1.4	OV-6a Product Definitions .....	33
6.2	Developing the OV-6a Model .....	37
6.2.1	Pre-Development Tasks .....	38
6.2.2	Development Tasks .....	38
6.2.3	Post-Development Tasks .....	39
6.3	Modeling the OV-6a Product Using SA .....	40
6.3.1	OV-6a Modeling Conventions .....	40
6.3.2	Modeling OV-6a Objects .....	41
6.3.3	OV-6a Best Practices .....	41
<b>7</b>	<b>OV-7 – Logical Data Model .....</b>	<b>43</b>
7.1	Summary Description .....	43
7.1.1	Product Purpose .....	43
7.1.2	Product Structure .....	43
7.1.3	Relationship to Other BEA Products .....	44
7.1.4	OV-7 Product Definitions .....	45
7.2	Developing the OV-7 Products .....	46
7.2.1	Pre-Development Tasks .....	47
7.2.2	Development Tasks .....	48
7.2.3	Post-Development Tasks .....	51

7.3	Modeling the OV-7 Product Using SA .....	51
7.3.1	OV-7 Modeling Conventions .....	51
7.3.2	Modeling OV-7 Objects .....	53
7.3.3	OV-7 Best Practices .....	59
<b>8</b>	<b>OV-6c – Business Process Model .....</b>	<b>61</b>
8.1	Summary Description .....	61
8.1.1	Product Purpose .....	61
8.1.2	Product Structure .....	61
8.1.3	Relationship to Other BEA Products .....	61
8.1.4	OV-6c Product Definitions .....	63
8.2	Developing the OV-6c .....	66
8.2.1	Pre-Development Tasks .....	67
8.2.2	Development Tasks .....	67
8.2.3	Post-Development Tasks .....	69
8.3	Modeling the OV-6c Using SA .....	69
8.3.1	OV-6c Modeling Conventions .....	69
8.3.2	Modeling OV-6c Objects .....	72
8.3.3	OV-6c Best Practices .....	73
<b>9</b>	<b>OV-2 – Operational Node Connectivity Model .....</b>	<b>75</b>
9.1	Summary Description .....	75
9.1.1	Product Purpose .....	75
9.1.2	Product Structure .....	75
9.1.3	Relationship to Other BEA Products .....	76
9.1.4	OV-2 Product Definitions .....	77
9.2	Developing the OV-2 Models .....	78
9.2.1	Pre-Development Tasks .....	78
9.2.2	Development Tasks .....	78
9.2.3	Post-Development Tasks .....	79
9.3	Modeling OV-2 Products Using SA .....	80
9.3.1	Modeling Conventions .....	80
9.3.2	Modeling OV-2 Objects .....	81
9.3.3	OV-2 Best Practices .....	82
<b>10</b>	<b>OV-3 – Operational Information Exchange Matrix .....</b>	<b>83</b>
10.1	Summary Description .....	83
10.1.1	Product Purpose .....	83
10.1.2	Product Structure .....	83
10.1.3	Relationship to Other BEA Products .....	84
10.1.4	OV-3 Product Definitions .....	86
10.2	Developing the OV-3 .....	86

10.2.1	Pre-Development Tasks .....	86
10.2.2	Development Tasks .....	87
10.2.3	Post-Development Tasks .....	87
10.3	Modeling OV-3 Products Using SA .....	88
10.3.1	Modeling Conventions .....	88
10.3.2	Modeling OV-3 Objects .....	88
10.3.3	OV-3 Best Practices .....	92
<b>11</b>	<b>SV-1 – Systems Interface Description .....</b>	<b>93</b>
11.1	Summary Description .....	93
11.1.1	Product Purpose .....	93
11.1.2	Product Structure .....	93
11.1.3	Relationship to Other BEA Products .....	95
11.1.4	SV-1 Product Definitions .....	96
11.2	Developing the SV-1 Products .....	96
11.2.1	Pre-Development Tasks .....	97
11.2.2	Development Tasks .....	97
11.2.3	Post-Development Tasks .....	101
11.3	Modeling SV-1 Products Using SA .....	102
11.3.1	Modeling Conventions .....	102
11.3.2	Modeling SV-1 Objects .....	104
11.3.3	SV-1 Best Practices .....	105
<b>12</b>	<b>SV-5b – Operational Activity to System Function Traceability Matrix .....</b>	<b>107</b>
12.1	Summary Description .....	107
12.1.1	Product Purpose .....	107
12.1.2	Product Structure .....	107
12.1.3	Relationship to Other BEA Products .....	108
12.1.4	SV-5 Product Definitions .....	110
12.2	Developing the SV-5 Products .....	110
12.2.1	Pre-Development Tasks .....	110
12.2.2	Development Tasks .....	111
12.2.3	Post-Development Tasks .....	113
12.3	Modeling the SV-5 Products Using SA .....	113
12.3.1	SV-5 Modeling Conventions .....	113
12.3.2	Modeling SV-5 Objects .....	114
12.3.3	SV-5 Best Practices .....	114
<b>13</b>	<b>SV-6 – System Data Exchange Matrix .....</b>	<b>115</b>
13.1	Summary Description .....	115
13.1.1	Product Purpose .....	115
13.1.2	Product Structure .....	115
13.1.3	Relationship to Other BEA Products .....	116

13.1.4	SV-6 Product Definitions.....	117
<b>13.2</b>	Developing the SV-6.....	117
13.2.1	Pre-Development Tasks .....	117
13.2.2	Development Tasks .....	118
13.2.3	Post-Development Tasks .....	118
<b>13.3</b>	Modeling the SV-6 Product Using SA .....	119
13.3.1	SV-6 Modeling Conventions .....	119
13.3.2	Modeling SV-6 Objects .....	119
13.3.3	SV-6 Best Practices .....	119
<b>14</b>	<b>TV-1 –Technical Standards Profile .....</b>	<b>121</b>
14.1	Summary Description .....	121
14.1.1	Product Purpose.....	121
14.1.2	Product Structure .....	121
14.1.3	TV-1 Product Definitions.....	123
14.2	Developing the TV-1 Products .....	124
14.2.1	Pre-Development Tasks .....	125
14.2.2	Development Tasks .....	125
14.2.3	Post-Development Tasks .....	126
14.3	Modeling the TV-1 Products Using SA .....	126
14.3.1	TV-1 Modeling Conventions.....	126
14.3.2	Modeling TV-1 Objects.....	126
14.3.3	TV-1 Best Practices.....	126
<b>15</b>	<b>DFMIR/FFMIA Guidance Model .....</b>	<b>128</b>
15.1	Summary Description .....	128
15.1.1	Product Purpose.....	128
15.1.2	Product Structure .....	128
15.1.3	Relationship to Other BEA Products .....	129
15.1.4	DFMIR/FFMIA Guidance Model Definitions.....	129
15.2	Developing the DFMIR/FFMIA Guidance Model.....	132
15.2.1	Pre-Development Tasks .....	132
15.2.2	Development Tasks .....	132
15.2.3	Post-Development Tasks .....	134
15.3	Modeling DFMIR/FFMIA Guidance Using SA.....	134
15.3.1	DFMIR/FFMIA Guidance Modeling Conventions .....	134
15.3.2	DFMIR/FFMIA Guidance Best Practices.....	135
<b>Appendix A : References .....</b>		<b>A-1</b>
<b>Appendix B : Product Checklists .....</b>		<b>B-1</b>
B-1: AV-1 Product Checklist.....		B-1
B-2: AV-2 Checklist .....		B-2

<b>B-2-1:</b> AV-2 Acronym Definitions Checklist.....	B-2
<b>B-2-2:</b> AV-2 Term Definitions Checklist.....	B-3
B-3: OV-2 Product Checklist .....	B-4
<b>B-3-1:</b> OV-2 Diagrams Checklist.....	B-4
<b>B-3-2:</b> OV-2 Definitions Checklist .....	B-5
<b>B-3-3:</b> OV-2 Integration Checklist.....	B-5
B-4: OV-3 Product Checklist .....	B-7
<b>B-4-1:</b> OV-3 Matrix Checklist .....	B-7
<b>B-4-2:</b> OV-3 Integration Checklist.....	B-7
B-5: OV-5 Product Checklist .....	B-8
<b>B-5-1:</b> OV-5 Diagrams Checklist.....	B-8
<b>B-5-2:</b> OV-5 Definitions Checklist .....	B-10
<b>B-5-3:</b> OV-5 Integration Checklist.....	B-11
B-6: OV-6a Product Checklist.....	B-12
<b>B-6-1:</b> OV-6a Definitions Checklist.....	B-12
<b>B-6-2:</b> OV-6a Integration Checklist.....	B-13
B-7: OV-6c Product Checklist.....	B-14
<b>B-7-1:</b> OV-6c Diagrams Checklist.....	B-14
<b>B-7-2:</b> OV-6c Definitions Checklist.....	B-15
<b>B-7-3:</b> OV-6c Integration Checklist .....	B-15
B-8: OV-7 Product Checklist .....	B-16
<b>B-8-1:</b> OV-7 Diagrams Checklist.....	B-16
<b>B-8-2:</b> OV-7 Definitions Checklist .....	B-17
<b>B-8-3:</b> OV-7 Integration Checklist.....	B-18
B-9: SV-1 Product Checklist.....	B-20
<b>B-9-1:</b> SV-1 Diagrams Checklist .....	B-20
<b>B-9-2:</b> SV-1 Definitions Checklist.....	B-21
<b>B-9-3:</b> SV-1 Integration Checklist.....	B-22
B-10: SV-5 Product Checklist.....	B-23
<b>B-10-1:</b> SV-5 Matrix Checklist.....	B-23
<b>B-10-2:</b> SV-5 Definitions Checklist.....	B-23
<b>B-10-3:</b> SV-5 Integration Checklist .....	B-23
B-11: SV-6 Product Checklist.....	B-25
<b>B-11-1:</b> SV-6 Matrix Checklist .....	B-25
<b>B-11-2:</b> SV-6 Integration Checklist.....	B-25
B-12: TV-1 Product Checklist.....	B-26
<b>B-12-1:</b> TV-1 Definitions Checklist.....	B-26
<b>B-12-2:</b> TV-1 Integration Checklist.....	B-26



B-13: DFMIR/FFMIA Guidance Product Checklist .....	B-27
<b>B-13-1: DFMIR/FFMIA Guidance Product Checklist</b> .....	B-27
<b>B-13-2: DFMIR/FFMIA Guidance Integration Checklist</b> .....	B-27
<b>Appendix C : Glossary</b> .....	<b>C-1</b>
<b>Appendix D : BEP AV-1 Template</b> .....	<b>D-1</b>
<b>Appendix E: BEA Improvement Proposal Template</b> .....	<b>E-1</b>

## Index of Figures

Figure 2-1, OV-SV-TV Relationship .....	2
Figure 4-1, AV-2 Integrated Dictionary .....	7
Figure 5-1, OV-5 Operational Activity Node Tree Example .....	12
Figure 5-2, Example of OV-5 Model for Manage General Ledger Transactions .....	13
Figure 5-3, Relationships between OV-5 and Other BEA Products .....	15
Figure 6-1, OV-6a BEA Product Mapping Decision Tree .....	33
Figure 6-2, Data Fields and Structure of a Business Rule .....	34
Figure 7-1, Example of an OV-7 Logical Data Model represented within BEA .....	43
Figure 7-2, Relationships between OV-7 and Other BEA Products .....	45
Figure 7-3, OV-7 BEP Color Set.....	52
Figure 8-1, Relationships Between OV-6c and Other BEA Products .....	63
Figure 8-2, Objects of an OV-6c Diagram .....	64
Figure 9-1, OV-2 Model Structure Diagram for Financial Management CBM.....	75
Figure 9-2, Relationships Between OV-2 and Other BEA Products.....	77
Figure 10-1, Relationships Between OV-3 and Other BEA Products.....	85
Figure 11-1, SV-1 Model for Real Property and Installations Lifecycle Management CBM .....	94
Figure 11-2, Relationships Between SV-1 and Other BEA Products .....	96
Figure 12-1, Example of an SV-5b.....	107
Figure 12-2, Relationships Between SV-5 and Other BEA Products .....	109
Figure 13-1, Example of an SV-6 Data Exchange Matrix.....	115
Figure 13-2, Relationships Between SV-6 and Other BEA Products .....	117
Figure 14-1, Example of the BEA TV-1 Matrix .....	121
Figure 14-2, Relationships between TV-1 and Other BEA Products.....	123
Figure 15-1, Data Fields and Structure of a DFMIR/FFMIA Guidance Statement.....	130

## Index of Tables

Table 5-1, Modeling Guidelines for Operational Activity Node Tree .....	22
Table 5-2, Modeling Guidelines for Operational Activity Model Diagrams .....	23
Table 6-1, Example of a BPM Process Tab.....	37
Table 7-1, BEA Accepted Class Words .....	55
Table 8-1, Modeling Guidelines for OV-6c.....	70
Table 9-1, Modeling Guidelines for the OV-2 Diagrams.....	80
Table 10-1, Example of an Operational Information Exchange Matrix .....	83
Table 10-2, Example of Information Exchange Tab .....	84
Table 10-3, Example of Information Assurance Tab .....	91
Table 11-1, Modeling Guidelines for the System Interface Diagram.....	102

# Acronym List

Acronym	Definition
A-0	Context Diagram (DoDAF OV-5)
APG	Architecture Product Guide
AV	All View (DoDAF) Acquisition Visibility (Business Enterprise Priority) Architecture Verification
AV-1	Overview and Summary
AV-2	Integrated Dictionary
BART	Business Architecture Reporting Tool
BDM	BEA Development Methodology
BEA	Business Enterprise Architecture
BEP	Business Enterprise Priority
BIP	BEA Improvement Proposal
BMA	Business Mission Area
BPD	Business Process Diagram
BPMN	Business Process Modeling Notation
BRM	Business Reference Model
BTAA	Business Transformation Agency
BTG	Business Transformation Guidance
CBM	Core Business Mission
CL	Confidentiality Level
DAMIR	Defense Acquisition Management Information Retrieval
DFMIR	Defense Financial Management Improvement Rules
DISR	DoD IT Standards Registry
DoD	Department of Defense
DoDAF	Department of Defense Architecture Framework
DOORS	Dynamic Object Oriented Requirements System

Acronym	Definition
E2E	End-to-End
EA	Enterprise Architecture
ETP	Enterprise Transition Plan
FEA	Federal Enterprise Architecture
FIPS	Federal Information Processing Standard
FM	Financial Management
FoS	Family of Systems
F&R	Findings and Recommendations
HRM	Human Resource Management
HTML	Hypertext Markup Language
IA	Information Assurance
ICOM	Input, Control, Output, Mechanism
IDEF0	Integrated Definition for Function Modeling
IDEF1X	Integrated Definition for Data Modeling
IE	Information Exchange
ISWG	Information Technology Standards Working Group
IT	Information Technology
LRP	Laws, Regulations and Policies
MAC	Mission Assurance Category
MSSM	Materiel Supply and Service Management
MV	Materiel Visibility
OMG	Object Management Group
OV	Operational View
OV-2	Operational Node Connectivity Description
OV-3	Operational Information Exchange Matrix
OV-5	Operational Activity Model
OV-6a	Operational Rules Model
OV-6c	Business Process Model

Acronym	Definition
OV-7	Logical Data Model
PV	Personnel Visibility
RPA	Real Property Accountability
RPILM	Real Property and Installations Lifecycle Management
SA	System Architect (Telelogic)
SBVR	Semantics of Business Vocabulary and Business Rules
SDE	System Data Exchange
SDO	Standards Develop Organization
SFIS	Standard Financial Information Structure
SME	Subject Matter Expert
SV	Systems and Services View
SV-1	Systems Interface Description
SV-5	Operational Activity to System Function Traceability Matrix
SV-6	Systems Data Exchange Matrix
SV-8	Systems Evolution Description
TRM	Technical Reference Model
TV	Technical Standards View
TV-1	Technical Standards Profile
WSLM	Weapon System Lifecycle Management

# 1 Introduction

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The BEA Architecture Product Guide (APG) was initially developed for the internal use of the architects, analysts and modelers at the Business Transformation Agency (BTA) as a guide to describe the methods, rules, and modeling conventions to be used by the development of the products that comprise the Business Enterprise Architecture (BEA). The BEA is the enterprise level architecture for the Department of Defense (DoD) Business Mission Area (BMA) in support of the warfighter.

Although the APG is directed mainly to architectural products included in the DoD Architectural Framework (DoDAF), it also provides guidance and product descriptions for non-DoDAF products that are part of the BEA to understand these products and their relationships to other DoDAF products.

## 1.1 Purpose and Scope

The purpose of the APG is to provide modelers and analysts with a user guide that describes how to define, create, update, and interpret products within the BEA. For each BEA product and associated elements, the APG contains a section that provides a summary description of the purpose, structure, relationship to other BEA products, and product definitions. Each section also includes procedures and tasks required to develop each product that can be applied independent of the repository and development tool used. Finally, each section identifies the applicable modeling standards and conventions required for the Telelogic System Architect (SA) tool has been used for BEA development since the first BEA deliverable.

The APG is intended for an audience that understands DoDAF and has SA training and/or experience. This document does not address guidelines for the Systems Evolution Description (SV-8), which pertains to the Enterprise Transition Plan (ETP) and is external to SA.

Section 2 of this document reviews key concepts from DoDAF that are incorporated into the BEA. Sections 3 through 14 set forth the specific modeling methods and conventions for developing or maintaining each product built for the BEA and describe how individual products are integrated and linked across views. The ordering for these sections follows the development order for the BEA as documented in the BEA Development Methodology (BDM). The Appendices provide templates, checklists and reference tools to complement the guidelines set forth in this document.

The primary information sources used to develop, revise and update this document are: *DoDAF* v1.5, *Integrated Definition for Function Modeling* (IDEF0), *Federal Information Processing Standard* (FIPS), *Integrated Definition for Data Modeling* (IDEF1X), *Object Management Group's* (OMG) *Semantics of Business Vocabulary and Business Rules* (SBVR) v1.0, and *Business Process Modeling Notation* (BPMN).

All approved Decision Memorandums through BEA 6.0 have been incorporated into this document.

## 1.2 Relationship to Other Documents

This document is intended to provide BEA practitioners the guidance and knowledge needed to maintain and extend the BEA. It provides supporting details on how to model relevant architecture products in accordance to the BDM and compiles best practices that have been tried and tested across the BEA lifecycle. The *End-to-End (E2E) BEA Development Process* provides guidance on specific documentation, approvals and sequencing of BEA development tasks. Changes to the BEA products are subject to Configuration Management (CM) procedures set forth by the *E2E Process*, including stakeholder reviews. Guidance regarding development and usage of the BEA in the overall context of DoD business transformation is presented in the *Business Transformation Guidance* (BTG).

## 2 Key Concepts

The BEA is the enterprise architecture for DoD's Business Mission Area. The BEA defines the Department's business transformation priorities, the Business Capabilities required to support those priorities and the combinations of systems and initiatives that enable these capabilities. This section describes key concepts required to understand the BEA guidelines for developing the set of integrated DoDAF products relevant to the BEA.

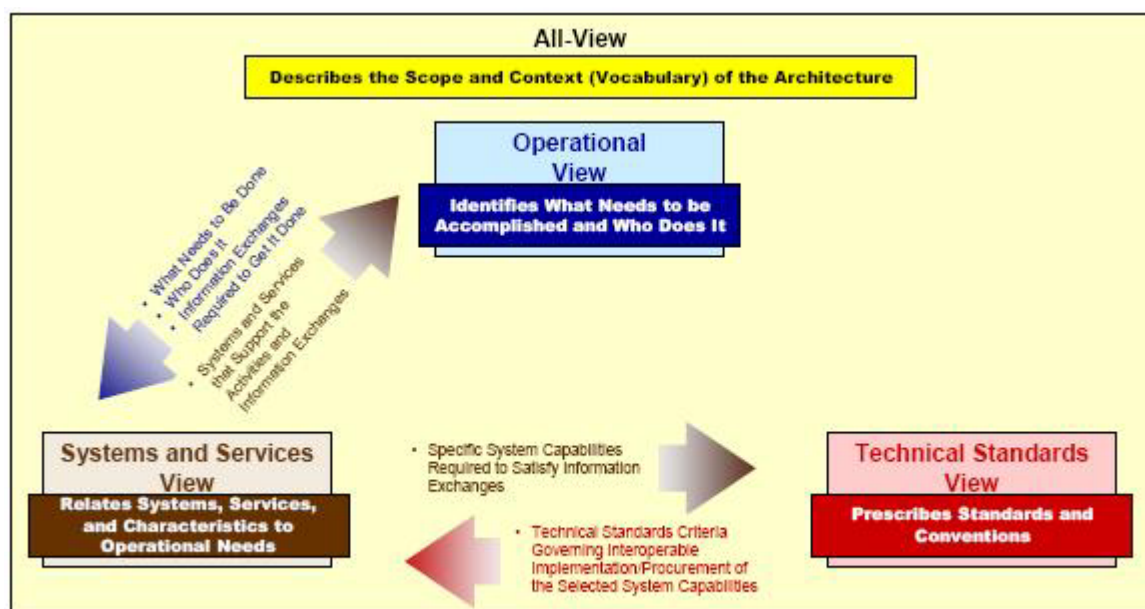
### 2.1 DoD Architecture Framework Architecture conventions

The BEA is an integrated architecture, as defined by DoDAF. There are four architecture views: the All View (AV), the Operational View (OV), Systems View (SV) and Technical Standards View (TV). Each view is composed of sets of architecture products depicted through graphic, tabular, or textual documents. Each of the four views depicts certain architecture attributes. Some attributes integrate multiple products, thereby providing integrity, coherence and consistency to the architecture.

An integrated architecture has designated, common points of reference linking the OV, SV, TV and AV products. An architecture is deemed integrated when development of its products and constituent architecture objects enables the architecture objects defined in one view to be identical (have the same name, definition and properties) when referenced in another view.

Figure 2-1, OV-SV-TV Relationship, shows the relationship among the views, as defined by DoDAF. The OV describes the business in terms of its operational requirements to meet specific objectives (missions), according to a high-level operational concept. In turn, the OV drives the SV to identify systems and services. The TV provides a common set of standards applicable to meet system requirements defined by the SV. To achieve consistency and ensure integration, DoDAF requires that the architecture provide explicit linkages among these views. The subsections that follow provide a more detailed description of each of the views and its application to the BEA.

Figure 2-1, OV-SV-TV Relationship



#### 2.1.1 All View

The BEA AV products provide information pertinent to the entire architecture but do not represent a distinct view of the architecture. The BEA AV-1 contains the Overview and Summary Document and the BEA AV-2 consists of an integrated dictionary.

### 2.1.2 Operational View

The BEA OV is a representation of the operational activities and related operational information required to accomplish DoD Core Business Missions. The OV contains graphical and textual products that describe the operational concept associated with accomplishing the core business missions, identifies the Operational Nodes, and assigned Activities to those nodes, and identifies the Information Exchanges (IEs) between Operational Nodes. The OV also defines the nature of the IEs, including the types of information being exchanged.

For the BEA, the OV shall be developed to address the following objectives:

- Identify Enterprise systems and technologies that support Business Processes and Operational Activities
- Describe Operational Activities and business processes common to Components of DoD
- Standardize commonly used Data Elements, Entities and Attributes, especially those providing enterprise views of business information or which are shared among DoD's Components
- Identify Business Rules which enable or constrain common business processes
- Identify Laws, Regulations and Policies (LRP) that constrain Operational Activities

### 2.1.3 Systems and Services View

The BEA SV is a set of graphical and textual products that describe systems, including their functions and interfaces. The SV associates systems capabilities to the OV. These system capabilities support the Operational Activities and facilitate the exchange of information among Operational Nodes.

The BEA SV shall address the following objectives:

- Define System Functions that automate applicable Operational Activities or portions of those Operational Activities
- Verification that the objectives, i.e., interoperability, are addressed by the depiction of system nodes, system entities, interfaces, and data exchanges.

### 2.1.4 Technical Standards View

The BEA TV is a set of tabular products that lists the set of standards that govern the arrangement, interaction and interdependence of system parts. The TV ensures that a system adhering to a set of standards can provide the required capabilities to satisfy a specified set of operational requirements. The TV provides the technical systems implementation guidelines for basic engineering specifications and common building blocks. The TV may include a collection of the technical standards implementation conventions, standards options and rules. Furthermore, the TV organizes criteria into profiles that govern systems and system elements for use across the BMA.

The BEA SV shall address the following objectives:

- Include Technical Standards that are applicable to the BMA
- Relate those standards to the appropriate DoD business systems

## 3 AV-1 – Overview and Summary Information

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### 3.1 Summary Description

This section describes the AV-1 architecture product, its relationship to other BEA products, the development method, and the guidelines used for its development.

#### 3.1.1 Product Purpose

The AV-1 Overview and Summary Information document provides executive-level information in a consistent form to identify the Purpose and Viewpoint, Context and Scope of each BEA release. AV-1 serves two additional purposes. In the initial phases of architecture development, it serves as a planning guide. Upon completion of the BEA, AV-1 provides summary Findings and Recommendations concerning the architecture.

#### 3.1.2 Product Structure

The AV-1 product is a text document without diagrams or matrixes and follows the standard DoDAF 1.5 structure for AV-1 products.

#### 3.1.3 Relationship to Other BEA Products

The AV-1 is the overall summary document for the BEA and sets the context for all the other BEA products. In particular:

- Any AV-1 related term with specialized meaning must be listed within the AV-2 and any acronyms introduced on the AV-1 must be listed within the AV-2 Acronym list.
- The AV-1 documents are the authoritative source for terms that are also used in the ETP and the BTG.

#### 3.1.4 AV-1 Product Definitions

The AV-1 does not have product specific terms. The AV-1 templates contain the standard descriptions used in the AV-1.

### 3.2 Developing the AV-1 Product

This section describes the approach to develop the AV-1 product.

The DoD Business Mission Area has focused the scope of its architectural development efforts around selected functional areas – or Business Enterprise Priorities (BEP). Six BEPs have been identified as the highest priority transformation initiatives at the DoD Enterprise level and serve as the current focus of the BEA development effort. Two levels of the AV-1 are developed for each release of the BEA, the BEP level AV-1 and the BEA level AV-1.

#### 3.2.1 Pre-Development Tasks

A BEP level AV-1 document is developed for each BEP to serve as a planning guide during the initial phases of architecture development. The initial BEP AV-1 Overview and Summary document describes the BEP and the scope of the work planned for a deliverable by that BEP. The specifics of each body of work planned for a deliverable are detailed in the BEA Improvement Proposals (BIPs) found in Appendix E.

The initial BEA level AV-1 Overview and Summary document is also developed during the initial planning phases of each deliverable according to the standard DoDAF 1.5 structure.



### 3.2.2 Development Tasks

During development of the specific BEA products, the BEA AV-1, BEP AV-1s and the approved BIPs are used as reference documents to guide development efforts and ensure that the actual development work stays within the scope planned.

### 3.2.3 Post-Development Tasks

The BEA AV-1 and BEP AV-1s are also used as a reporting mechanism for identifying Findings and Recommendations (F&R) during the final phases of the deliverable cycle after all development and integration work has been completed. The F&Rs section of the BEP AV-1 comprises two parts:

- Part 1 is a review of the work identified in the BIPs for completeness and specific mappings of architecture achievements to BEP objectives.
- Part 2 includes other F&Rs for additional future development efforts. New F&Rs are developed, previously documented F&Rs are updated, and a disposition of previous F&Rs is reported.

The initial BEP AV-1 Overview and Summary and the F&R (Parts 1 and 2) encompass the final BEP AV-1 document.

Also at the end of the development cycle the BEA AV-1 is finalized by updating the initial Overview and Summary as needed and by reviewing comments, findings and recommendations from all BEA stakeholders, and combining them into the BEA level F&Rs that are added to the final BEA AV-1 document.

Guidance on developing the BEP AV-1 is found within the *BEP AV-1 Template* in Appendix D. Guidance on developing a BIP is found within the *BEA Development Methodology* and the *BIP Template* provided in 15.3.2.2E. The BIP is the basis for creating Parent and Child Change Requests at the beginning of the development cycle.

## 4 AV-2 – Integrated Dictionary

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### 4.1 Summary Description

This section describes the AV-2 Integrated Dictionary, its relationship to other BEA products, the development method and the product guidelines to be followed.

#### 4.1.1 Product Purpose

The AV-2 is the Integrated Dictionary for the BEA and contains all descriptions and terms that are used in the other BEA products. The AV-2 provides a central repository for a given architecture's data and metadata which enables the set of architecture products to stand alone, allowing them to be understood with minimal reference to outside resources. The AV-2 is an accompanying reference to other products. The key to long-term interoperability resides in the accuracy and clarity of these definitions, and its value lies in unambiguous definitions.

#### 4.1.2 Product Structure

The AV-2 is a textual product in table format and consists of a glossary, a repository of architecture data, their taxonomies, and their metadata (i.e., data about architecture data), including metadata for tailored products, associated with the architecture products developed.

. Each description name is classified and located in the AV-2 by:

1. **Object Type:** The major classification scheme in the AV-2.
2. **Name:** The specific name of an instance of the Object Type.
3. **Description:** The full description (definition) of the listed Name.
4. **Related Object:** Terms pertaining to certain Object Types in the AV-2 are also defined as related to other objects to assist the user in interpreting the Term based on the context of the relevant relationships in the BEA.

An example from the AV-2 for Business Capabilities is provided in Figure 4-1, AV-2 Integrated Dictionary, to illustrate a Business Capability that is related to multiple Operational Activities.

Figure 4-1, AV-2 Integrated Dictionary

Business Capability Definitions		
Name	Description	Operational Activities
<a href="#">Administer Position Management</a>	All capabilities associated with developing, analyzing and implementing position plans, managing strength levels against those plans. This includes integrating force structure requirements into personnel functions enabling proper utilization of Department of Defense human resources through structuring organizations validating organizations against budgetary constraints, establishing and allocating positions, and managing programs required to support strategic goals.	<a href="#">Administer Position Management</a> <a href="#">Manage Organizational Structure</a> <a href="#">Perform Workforce Analysis</a> <a href="#">Perform Workforce Budgeting</a> <a href="#">Perform Workforce Planning and Programming</a>
<a href="#">Conduct Program Management</a>	This capability exercises centralized authority and responsibility for planning, organizing, staffing, controlling and leading the combined efforts of participating/assigned civilian and military personnel organizations for the management of specific defense acquisition or programs throughout the system life cycle.	<a href="#">Conduct Program Management</a>

As a consequence of the BEA's internal integration, there are cases where the same description name may be listed separately in the AV-2 under multiple object types, but with different descriptions due to its usage and context in the BEA. There are also limited cases where the same description is used for different names in different object types due to the development process for that description name.

### 4.1.3 Relationship to Other BEA Products

The AV-2 relates to all the other BEA products. In particular:

- All objects from selected deliverable object types (e.g. Operational Activity, Entity or Business Rule) from other BEA products must be listed and defined in the AV-2.
- Any terms with specialized meaning must be listed in the AV-2; these specifically include, but are not limited to the descriptions of all deliverable architectural object types.  
**Exception:** Terms from LRPs and DFMIR/FFMIA Guidance Statements are specifically excluded from the requirement to be captured in the AV-2.
- Any acronyms used within the architecture must be included in the AV-2 Acronym Definitions report, subject to the scope defined in the next section.

### 4.1.4 AV-2 Product Definitions

The AV-2 does not have product specific terms.

## 4.2 Developing the AV-2 Product

### 4.2.1 Pre-Development Tasks

There are no pre-development tasks related to the AV-2 Product.

### 4.2.2 Development Tasks

The AV-2 is generated automatically during development of the architecture products in the SA encyclopedia. The two exceptions are Acronyms and Term definitions pertaining to architecture products not stored in SA, which are entered manually in the AV-2.

Whenever an Acronym or a Term is used in a changed or new DoDAF object description, the existing Acronym List or Term List should be examined to see whether the Acronym or Term has been previously defined. If the

Acronym or Term exists, then the description of the Acronym or Term should be reviewed to determine whether it is the correct description within the context use of the acronym or term.

The scope of the AV-2 Acronym Definitions report and Terms Definitions report cover all the BEA products that are in the SA encyclopedia and the AV-1 Overview and Summary Information document. AV-2 Acronyms and Terms that also appear on the BEA Summary, the ETP, BTG, BDM, APG, the Congressional Report<sup>1</sup>, and overall summary documents and Web pages must be applied the same description set forth in the AV-2.

Acronyms introduced in LRP descriptions, Business Guidance statements, Configuration Management documents and the BEA E2E Process documents are not required to be listed in the AV-2. The AV-2 Acronym Definitions report contains four types of character groupings:

1. **Abbreviation:** A shortening of a word or phrase.
2. **Acronym:** An abbreviation that forms a word.
3. **Initialism:** An abbreviation that uses the first letter of each word in a phrase. Also known as mnemonic.
4. **Short name:** A term that is a shortened version of a longer name. This grouping is reserved for the names of systems. Details of a particular short name may be found in DITPR.

For the purpose of generating the AV-2 Acronym Definition report, the first three character groupings (abbreviations, acronyms and initialisms) are all considered “Acronyms”. Although additional information about an acronym may be found within the BEA, the acronym is only defined in the AV-2 and not within the description of a particular BEA product. New or changed BEA product descriptions that include acronyms must follow this rule. It is anticipated that once Business Guidance items are converted to Business or System Rules, acronym use in all BEA product descriptions will be changed to conform to this rule.

**Exception:** Acronyms may be defined in Business Guidance items, LRP, ETP, BTG, BEA Summary, Congressional Report, and overall summary documents and Web pages. In particular:

- The BEA Summary and overall summary documents may also include an Acronym list that covers the scope of the document. For these documents, an acronym is described at first use in the document and entered into the acronym list within the document. Subsequent uses of the acronym do not re-describe the acronym.
- Web pages may include a description with each use of the acronym to provide a quicker understanding by a more casual user or reader.

Conversely, a short name that is included in the AV-2 Acronym Definitions report can also be described within the description of a BEA product because a short name typically pertains to a system or application name that is used only within SV product descriptions. Additional information about a short name may be found outside of the BEA in DITPR.

In certain cases, the same acronyms or short name may have multiple descriptions. To avoid confusion, the term is listed only once in the AV-2 Acronym Definition report, with multiple entries in the description field. The BEA user must determine the correct description within the context of the use of the acronym. For example, the acronym “FMS” corresponds to both Financial Management System and Foreign Military Sales.

The AV-2 Term Definitions report contains words and phrases that are recognized by BEA users as having a specialized meaning within the BEA or DoD business community, which differs in scope of use from the typical dictionary definition.

To be included in the AV-2, a term must have a precisely limited meaning in a particular context and it should qualify as being:

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<sup>1</sup> Formerly known as the March Congressional Report

- **Basic:** Not derived or computed from other terms
- **Atomic:** Not divisible, collective or composite
- **Knowable:** Not events or actions
- **Unambiguous:** Not subjective

Generally, each word in a Term is capitalized. There may be exceptions where common, generally accepted use of a Term does not follow this convention. Spelling and capitalization of a Term should be identical in the SA object description and the AV- 2 Term Definition list.

A term must be described in the AV-2 Term Definitions report within the context of its use. To avoid confusion when a Term has different uses with distinct definitions, the term is listed only once in the AV-2 Term Definitions report with multiple entries in the description field. The BEA user must determine the correct description within the context of the use of the term. In the example shown below, the term “Transition” may be applied to both the non-system context and the system context, but the term “Transition Type” has a distinct definition for each.

Transition	The act of carrying out business transformation - moving from one state to another.
Transition Type	Non-system - Policy Change - Process/Organizational Improvement - Outsourcing System - Modification or re-use of an existing system - Modification or use of an existing procurement - New Initiative

As a rule, a term is described only in the AV-2 Terms Definitions list and not in the description of a BEA product. New or changed BEA product descriptions that include terms must follow this rule. It is anticipated that over time, term use in all BEA product descriptions will be changed to conform to this rule.

**Exception:** Terms listed in the AV-2 may also be defined in the Business Guidance items, LRP, the ETP, BTG, BEA Summary, Congressional Report, and overall summary documents and Web pages. However, the term must be applied the definition set forth in the AV-2.

The Stakeholder that develops a BEA product also drafts the initial description of an Acronym or Term used in conjunction with the BEA product. The architecture development team reviews the description and may propose refinements, subject to approval by the team that developed it, before entering it into the AV-2. The Stakeholder may also provide key source information and other descriptive information, where deemed helpful.

With the exception of acronyms and terms manually entered into the AV-2, all AV-2 definitions are automatically generated from the BEA products in the SA encyclopedia. Any changes to these definitions must be made to the BEA products that introduce that specific term, as well as the definitions regenerated for the AV-2.

### 4.2.3 Post-Development Tasks

As part of the integration review for each product, all AV-2 descriptions are confirmed, both auto-generated and manually input names and descriptions.

## 4.3 Modeling the AV-2 Product Using SA

### 4.3.1 AV-2 Modeling Conventions

Refer to each product section for modeling conventions.

### 4.3.2 Modeling AV-2 Objects

Refer to each product section for modeling specific objects.

### 4.3.3 AV-2 Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 4.3.3.1 AV-2 Lessons Learned

- Ensure that the AV-2 is generated after all of the BEA products are stabilized.
- Perform regular and early communication with other architecture product teams to assess impact of proposed changes in other products on the AV-2.
- Review BEA descriptions to ensure all shared Definitions, Acronyms and Terms have the same descriptions in related documents, such as the BEA AV-1, BEA Summary, BDM, ETP, BTG, and the Congressional Report.
- Ensure that all exception reports are reviewed and resolved.

#### 4.3.3.2 AV-2 Common Pitfalls

- Failure to ensure that all relevant BEA Acronyms and Terms are included in the AV-2.
- Failure to coordinate AV-2 Acronym and Term Lists with the BEA Summary, ETP, BTG, BDM, APG, the Congressional Report, and overall summary documents and Web pages.

## 5 OV-5 – Operational Activity Model

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### 5.1 Summary Description

This section describes the OV-5 Operational Activity Model, its relationship to other BEA products, the development method, and the modeling guidelines used to be followed.

#### 5.1.1 Product Purpose

The OV-5 Operational Activity Model is the cornerstone architecture product for the BEA. The OV-5 is used to describe the operations that are normally conducted in the course of achieving a mission or a business capability.

The OV-5 describes what DoD does in the BMA, but does not address how the activities are performed or the sequence of those activities. Other Enterprise Architecture products are built from and aligned with the Enterprise OV-5 Operational Activity Model. For the BEA, there shall be a single Enterprise-level OV-5 Operational Activity Model to represent the DoD Business Mission.

The BEA OV-5 Operational Activity Model defines a set of Operational Activities, their relationships, and information requirements needed to perform major DoD business operations. The model incorporates industry and government leading practices, examines doctrine and policy implications, and defines operational requirements.

The OV-5 Operational Activity Model can be used to:

- Support alignment of services, systems and solutions to the prioritized strategic capabilities of the Department
- Distinguish Core Business Mission (CBM)/BEP-specific Activities.
- Define or flag issues, opportunities, or information dependencies among Activities that need to be scrutinized further.
- Identify data are pertinent to the Enterprise.
- Identify the context or framework on how certain aspects of the business will be performed.

#### 5.1.2 Product Structure

The OV-5 product is depicted as a set of diagrams. It comprises a single BEA OV-5 Activity Node Tree, or simply Node Tree, and a series of OV-5 Operational Activity Model diagrams, as described in the following sections.

##### 5.1.2.1 OV-5 Activity Node Tree

The first diagram constructed during development of the architecture is the OV-5 Activity Node Tree, a functional, hierarchical decomposition of Enterprise-level Operational Activities for the DoD BMA. The activities on the Node Tree are created and defined to meet the following objectives:

- Adherence to DoD business needs
- Compliance with DoD Initiatives
- Alignment with the direction of the “To Be” world
- Alignment with the Federal Enterprise Architecture (FEA) Business Reference Model (BRM), where possible.

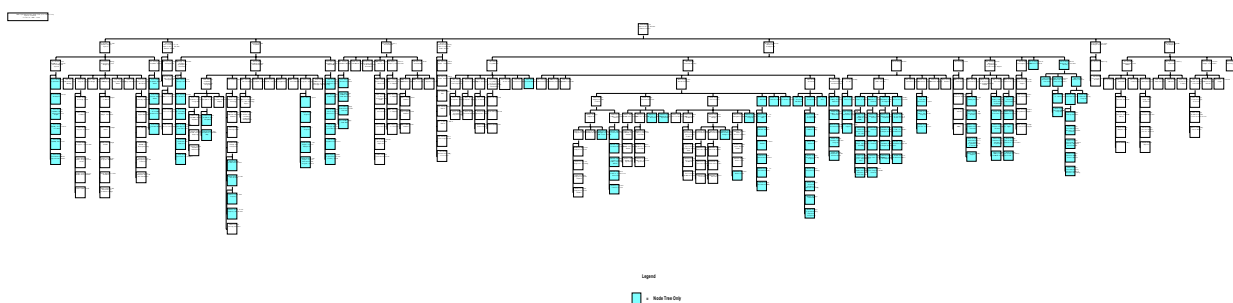
The Node Tree is decomposed to a level that identifies the lowest-level activities that are performed at the Enterprise-level to support associated Business Capabilities. While multiple CBM/BEPs may be identified as

stakeholders for an Operational Activity, meaning the activity is relevant to them, a primary CBM/BEP is responsible for defining its basic content. Further decomposition below the Enterprise level is not within the province of the BTA, but is the responsibility of the Components with a goal toward identifying Federation touchpoints to the Enterprise level.

Figure 5-1, OV-5 Operational Activity Node Tree Example, illustrates the proper form for an Activity Node Tree Diagram. (It should not be considered to be the current Node Tree.) There will be a single Operational Activity Node Tree diagram for each BEA release. The top box of the Node Tree diagram shall be a single Operational Activity that is shown on the Context Diagram (A-0) of the Activity Model. All remaining Activities that appear in the OV-5 Operational Activity Model shall then be arranged according to their proper Parent-Child relationships beneath the A-0 activity.

The white Operational Activities represent activities that have been integrated into the BEA, meaning they are on an OV-5 Activity diagram with the Inputs, Controls, Outputs and Mechanisms (ICOMs) identified. The blue Operational Activities represent activities that appear only on the OV-5 Node Tree will be used for future development and/or portfolio management to categorize systems.

**Figure 5-1, OV-5 Operational Activity Node Tree Example**



Based on the approved Node Tree, the OV-5 diagrams will be created or updated for non-leaf activities designated as “Integrated”. The ICOMs for these activities are identified during workshops. All Operational Activities definition must be distinct and expressed at their level of decomposition. The Operational Activity definitions will be updated during future work, such as during workshops, when ICOMs are added to the diagrams and the activity definitions are updated to reflect them.

### 5.1.2.2 OV-5 Operational Activity Model Diagram

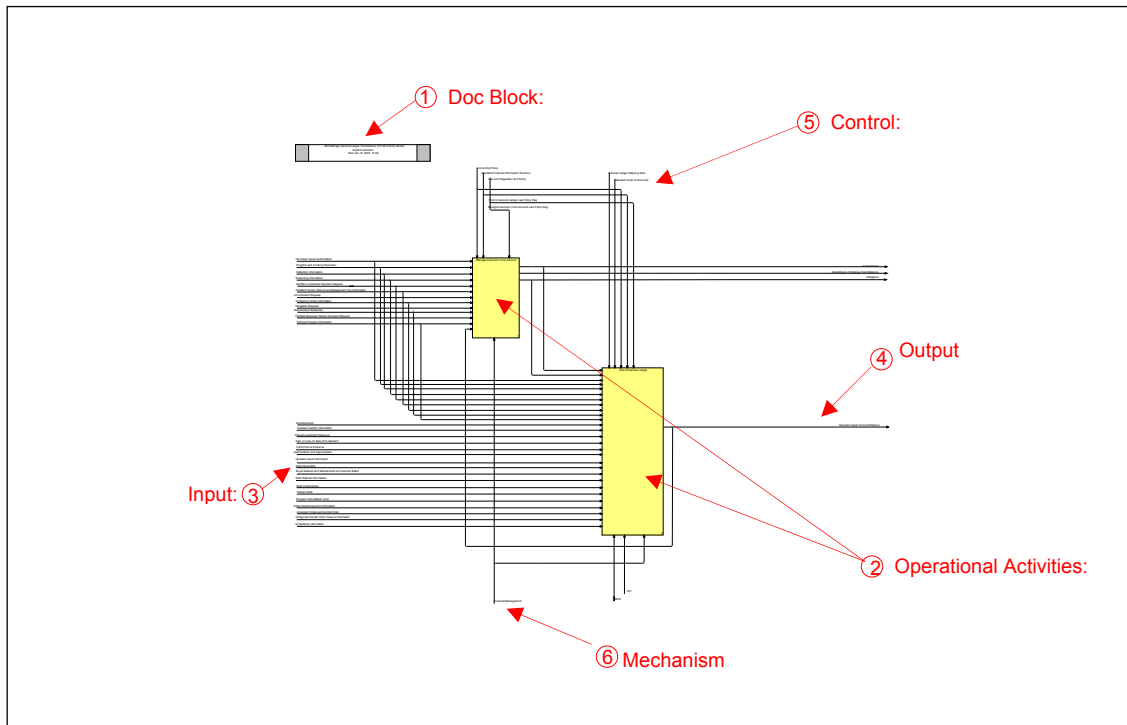
The OV-5 Operational Activity Model Diagram represents the Operational Activities and their information dependencies between Activities within the DoD BMA and external to the DoD BMA.

Associated with each Operational Activity, at any level of decomposition, is a description of the Activity, required information Inputs and Outputs of the Activity, Controls or Data Initiatives that direct or constrain the Activity, and Mechanisms that identify CBM(s) and the System(s)/Initiative(s) that perform the activity.

Figure 5-2, Example of OV-5 Model for Manage General Ledger Transactions, shows an Activity model for Manage General Ledger supporting the Financial Management CBM. (It should not be considered to be the current BEA diagram.)



Figure 5-2, Example of OV-5 Model for Manage General Ledger Transactions



As indicated in Figure 5-2, Example of OV-5 Model for Manage General Ledger Transactions, the objects or main features used to represent the OV-5 Activity model are:

- **Doc (title) block (1)**, located in the upper left corner of the diagram. The title block contains the diagram name and type in the format “A83 Manage General Ledger Transactions (OV-5 Activity Model)”, as well as the last modification date. The double gray bars indicate that the diagram is a decomposition of a parent activity.
- **Operational Activities (2)**, shown as the yellow rectangular shapes in the diagram. Two Operational Activities are shown in the example: “Manage Execution Fund Account” and “Post to General Ledger” which support Manage General Ledger Transactions. Operational Activities create or transform Outputs based on the Controls and Inputs
- **ICOMs (3, 4, 5, 6)**, shown as arrows on the diagram, represent the Inputs, Controls, Outputs and Mechanisms for the Operational Activities.
  - (3) **Inputs** – Information that is transformed or consumed by the Operational Activity;
  - (4) **Outputs** – Information that is produced by the Operational Activity;
  - (5) **Controls** – Identifies what Laws, Regulations and Policies and Data Initiatives constrain the Operational Activity;
  - (6) **Mechanisms** – Identifies which CBM and System, if identified, performs the Operational Activity as well as any Initiative that will become a System in the future.

The BEA OV-5 Operational Activity models are developed in accordance with the specifications contained in this document, which are derived from DoDAF and IDEF0 modeling techniques. Exceptions to these standards that are required to develop this model shall be accommodated with appropriate approved authority and shall be incorporated within this document after each deliverable as the cornerstone product. The Enterprise OV-5 Activity Model will be used as a guide to restructure and update other OV and SV products as development continues in future releases of the BEA. This will ensure a complete, integrated and consistent architecture.

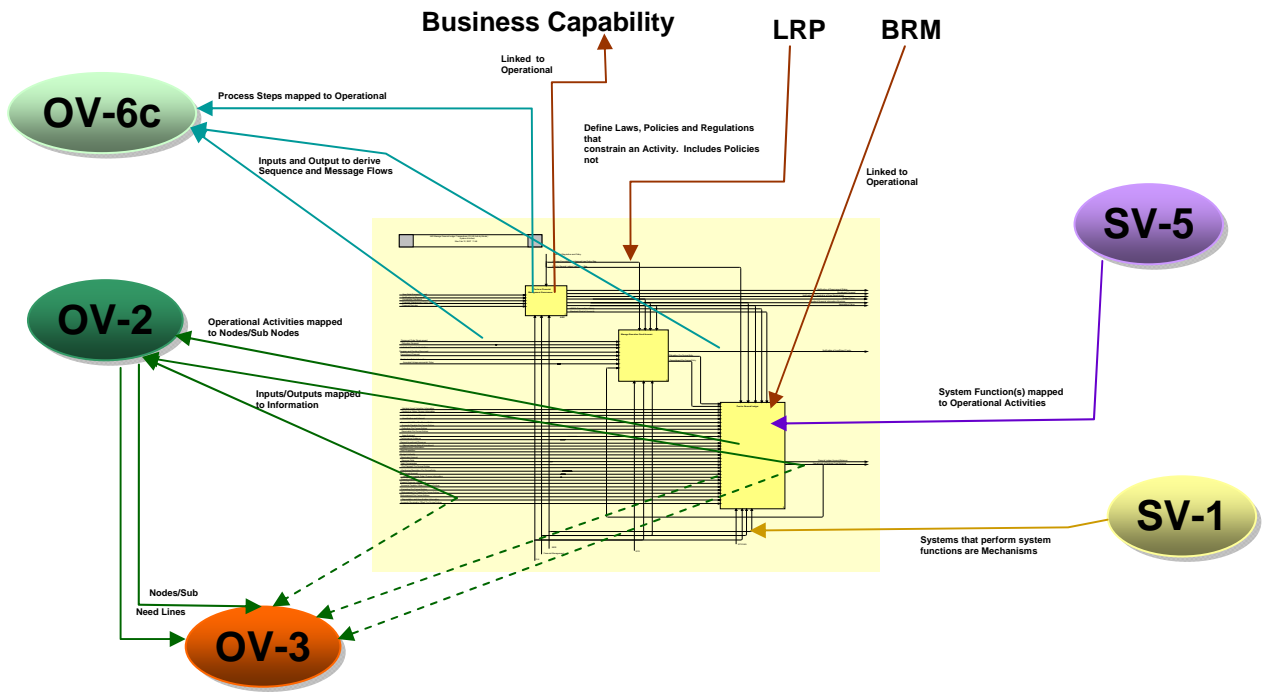
### 5.1.3 Relationship to Other BEA Products

As illustrated in Figure 5-3, the OV-5 Operational Activity Model is related to other BEA products as follows:

<b>AV1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the OV-5 is affected in the release.
<b>AV-2</b>	<p>All OV-5 terms with specific meaning must be defined in the AV-2 Term definitions report. These terms must include, as a minimum, all the following object types:</p> <ul style="list-style-type: none"> <li>• Business Capability Definitions</li> <li>• ICOM Arrow Definitions</li> <li>• Operational Activity Definitions</li> </ul> <p>All acronyms used in the OV-5 descriptions must be listed and spelled out in the AV-2 Acronym Definitions report.</p>
<b>OV-2</b>	Operational Nodes in the OV-2 represent logical groupings of leaf-level <sup>2</sup> Operational Activities from the OV-5. The Activities are assigned to the Operational Nodes in the OV-2, and related leaf-level Inputs, and Outputs from the OV-5 are then translated to IEs that depict the required information flow represented on the OV-2 as Need Lines between Operational Nodes. The Operational Nodes are CBM(s) and are represented as Mechanisms on the OV-5 Activity Model diagrams.
<b>OV-3</b>	Each leaf-level Input and Output ICOM Arrow on the OV-5 diagram connecting Operational Activities in Operation Nodes is represented as one or more IE(s) in the OV-3.
<b>OV-6a</b>	<b>Note:</b> For BEA 6.0, a decision was made that Business Rules shall only be linked to the OV-6c Process Steps, not to the OV-5.
<b>OV-6c</b>	Process Steps in the Business Process Model (OV-6c) are derived from and link to Operational Activities in the OV-5. Data Objects in the OV-6c are related one to one to OV-3 Information Exchanges, which are mapped to the Inputs and Outputs of Operational Activities in the OV-5 Activity Model.
<b>OV-7</b>	Entities or Attributes within Entities in the OV-7 are derived from and linked to Inputs and Outputs on the OV-5 via the Information Exchanges in the OV-3.
<b>SV-1</b>	Enterprise Systems that perform system functions are the Mechanisms on the OV-5.
<b>SV-5</b>	Operational Activities from the OV-5 are mapped to System Functions in the SV-5. BTA has created a modified SV-5 that shows Operational Activities mapped from Business Capabilities and to System Functions with the identified Enterprise System, if available, in the intersection.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-5 and the TV-1.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-5 and the DFMIR/FFMIA Guidance Model.

<sup>2</sup> Leaf-level Operational Activities are the lowest-level white operational activities.

Figure 5-3, Relationships between OV-5 and Other BEA Products



## 5.1.4 OV-5 Definitions

### 5.1.4.1 Operational Activity Node Tree Definitions

The following are definitions of the key elements contained in the OV-5 Operational Activity Node Tree:

- **Parent Activity:** An Operational Activity that is decomposed into two to nine Operational Activities, or Child Activities. The definition of the Parent Activity is the sum of the child Operational Activities and serves to set the scope of its decomposition.
- **Child Activity:** An Operational Activity that is a decomposition of a parent Operational Activity. It represents a functional aspect of its Operational Activity.
- **Hierarchy Chart Connectors:** These lines connect a Parent Activity to its Child Activities and show the relationships between activities.

### 5.1.4.2 Operational Activity Model Definitions

The following are definitions of the key elements contained in OV-5 Operational Activity Models:

- **Operational Activity:** An action performed in conducting the business of an enterprise. This is a general term that does not imply a placement in a hierarchy or a timing sequence (for example, it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the Operational Activity Model).
- **ICOM Arrows:** Represent the **I**ntputs, **C**ontrols, **O**utputs and **M**echanisms that define information relationships in an Activity Model. In particular:
  - **Inputs:** Information received from another Operational Activity, either internal or external to the model, which is needed for the given Operational Activity to be carried out.
  - **Controls:** Information that guides or constrains the way an activity is performed.

In the BEA, there are two types of Controls: External and Internal.

- External Controls are decomposed from the *Laws, Regulations and Policies* parent Control and the definition of an External Control is generated based upon mappings of LRPs to process steps as maintained in the LRP Repository. The External Control Information Assurance is not decomposed and is tunneled into the architecture<sup>3</sup>. External Data Initiatives that represent Controls are those that are not created by a BEA Activity.
- Internal Controls are Initiatives that are created as Outputs from other Operational Activities within the BEA OV-5 Operational Activity Model. Internal Controls, while Outputs from other BEA Operational Activities, are not depicted as IEs in the OV-2 or OV-3 products.

Initiatives, both External and Internal, can be one of the following:

- **Data Initiatives**
- **Policy Initiatives**
- **Process Improvement Initiatives**
- **Outputs:** Information that has been transformed or created by the Operational Activity and sent to another internal Operational Activity or to an external activity (outside the scope of the BEA BMA model/viewpoint).
- **Mechanisms:** Resources used to perform the activity. Mechanisms will be CBMs and the Systems or Initiatives, as defined by the Stakeholders.
  - **Existing Systems Initiatives (Milestone B and beyond):** Shown as Mechanisms on the OV-5 and as systems on the SV products.
  - **Future Systems Initiatives (pre-Milestone B):** Shown as Mechanisms on the OV-5 and not shown as systems on the SV products.

## 5.2 Developing OV-5 Models

This section describes the approach to develop, extend and maintain the OV-5 Operational Activity Model. The OV-5 is developed in SA as a diagram. In accordance with DoDAF, the BTA requires a single, integrated OV-5 Operational Activity Model that:

- Covers the scope of the DoD BMA
- Incorporates results from Subject-Matter Expert (SME) attended workshops
- Aligns Operational Activities with the FEA BRM

Such a single, integrated, Enterprise Activity Model provides the context for linking and grouping supporting Operational Activities within the DoD BMA, and provides a starting point for the development of more detailed activity models built by the CBMs.

The Enterprise-level OV-5 Activity Model defines the “To Be” activities and business information requirements to optimize DoD business operations in support of the warfighter. Specifically, the Enterprise OV-5 will be an integrated architecture product used to identify business information, Systems/Initiatives, constraints and activities as a basis for the rest of the enterprise architecture.

<sup>3</sup> A tunneled arrow is an arrow (with special notation “()”) that does not follow the normal requirement that each arrow on a diagram must correspond to arrows on related parent and child diagrams also called balancing the Parent-Child diagram.

Using a spiral development approach through facilitated workshops, Business Analysts, Modelers and Architects provide functional and technical subject-matter expertise to perform tasks in every step of development of the OV-5 model.

As described above, the OV-5 Node Tree is the initial product to be constructed; it is a functional hierarchical decomposition of DoD Enterprise Activities that bounds what DoD does across the BMA. These Enterprise Activities are reconciled against DoD business needs and with any existing OV-5 Operational Activity Models. FEA BRM functions also are analyzed during construction of the Node Tree and any necessary adjustments are made to the alignment or the content of the Node Tree. During this work, gaps and additional work are identified in the Enterprise Operational Activities. The Gap Analysis is performed in conjunction with the Planned Capability Improvements identified in the BEP AV-1 and the related BIP created for each proposed body of work to improve the BEA. These activities form the basis for selection of Change Requests (CR for each architecture product. Identified gaps are addressed during a deliverable or noted for future work. Identified gaps in the FEA BRM are noted and passed to BTA Management.

Once the Node Tree is defined, stabilized and approved, Enterprise-level OV-5 Operational Activity Model diagrams are created for each integrated Operational Activity of the Node Tree. ICOMs are added to the diagrams during workshops. The diagrams show the information dependencies between Operational Activities as ICOMs. ICOMs are based on approved sources, to include existing Operational Activity Models and other industry reference materials or Government-Furnished Information (GFI).

### 5.2.1 Pre-Development Tasks

The tasks that must be completed prior to OV-5 development and/or maintenance are:

- Review the BEP's AV-1 and BIP to understand the impact of the planned body of work on the OV-5 Operational Activity Model.
- Identify products that could potentially be affected by OV-5 changes and begin coordination within the Architecture Development Team. A thorough analysis of the existing SA USRPROP.txt file should be performed prior to the start of any extension or maintenance activities. The SA tool uses this file to add, delete and modify properties associated with architecture products and objects, such as Operational Activities and ICOMs. The USRPROP.txt file also allows the specification of linkages to other architecture definitions, such as FEA BRM Sub-functions as well as the OV-6c. This analysis provides a list of current tool configuration modifications contained in the USRPROP.txt file. The list will be assessed to:
- Identify modifications no longer needed to support the BEA.
- Identify modifications that will be needed to support extensions and/or modifications to the BEA.
- As necessary, changes to the USRPROP.txt file are proposed and approved through a configuration management process. The Architecture Development Team implements these changes.

### 5.2.2 Development Tasks

The development and maintenance of the OV-5 Operational Activity model is accomplished in facilitated workshops that include Government SME participation to address content and validate results. The following subsections describe the approach used to develop the Enterprise OV-5 Operational Activity Model for the BEA. Each subsection sets forth the specific tasks that must be accomplished to in each stage of the development phase. Although most of these steps are sequential, it is common to start some steps before a previous step is completed.

#### 5.2.2.1 Creating/Modifying the OV-5 Product

This section describes the approach to develop the OV-5 Operational Activity Model.

##### 5.2.2.1.1 Update Activity Node Tree

Reviewing and updating the Node Tree is the first modeling step when implementing any BEA Improvement Proposal. The Node Tree shows in a hierarchical fashion the proper grouping and decomposition of activities. It

provides a navigation map for the OV-5 Operational Activity Model diagrams, which are based on the white Operational Activities on the Node Tree.

The Node Tree is decomposed to a level that identifies the lowest-level activities that are performed at the Enterprise level to support associated Business Capabilities.

The tasks that must be completed prior to the OV-5 Operational Activity Model development and/or maintenance are:

1. The leaf-level Operational Activities within each branch of the Node Tree are linked to Business Capabilities and to Sub-functions of the FEA BRM. These linkages are maintained in the BEA, as described in Section 6. The Node Tree is updated in workshops as a cooperative effort between Government SMEs and appropriate BTA members (both technical and functional).
2. During development of the Node Tree, stakeholders shall be identified on the appropriate tab in the Operational Activity definition. Process Steps and System Functions will be mapped to the correct Operational Activity later in the process.
3. Use the procedure below to maintain the Node Tree:
  - Create and define Operational Activities during BEP Workshops that cover the scope areas as defined in the BIPs, based on approved sources. Approved sources include existing approved OV-5 Operational Activity Models; CBM/BEP SMEs; and FEA BRM Lines of Business and Sub-function definitions.
  - Arrange activities in the node tree and normalize the arrangement by eliminating overlapping and redundant activities. The top level of the Node Tree shall have one Operational Activity, which sets the scope of the BEA in general and the OV-5 architecture product in particular. Subsequent Operational Activities shall be decomposed and arranged, where appropriate, into two to nine Operational Activities.
  - Align the Operational Activities with the Lines of Business and/or Sub-functions in the current FEA BRM that should be reflected in the OV-5. Gaps in the FEA BRM should be noted as feedback to the FEA BRM community; gaps in the BEA itself should be noted as areas for possible future BEA improvement.
  - Review artifacts from prior approved versions of the BEA relevant to current or new OV-5 development. Create or refine existing definitions of Operational Activities based on this review.
  - Validate the resulting Operational Activity definitions.

#### **5.2.2.1.2 Generate OV-5 Activity Model Diagrams**

The SA tool can automatically generate OV-5 Operational Activity Model diagrams from a Node Tree. However, this feature was only available for the initial setup of the OV-5 architecture product as part of BEA 1.0. Any subsequent changes to the OV-5 diagrams must be incorporated manually, since SA cannot automatically generate updates to activity model diagrams from changes made in the Node Tree. Each time the utility is run it generates a completely new set of activity model diagrams, replacing only the diagrams modified by the architecture development team.

Therefore, attention to detail is required when updating the OV-5 to ensure that the Node Tree and all affected diagrams are updated to the level of decomposition approved for each new or modified Operational Activity to avoid misalignment among the OV-5 Operational Activity Model diagrams or between the OV-5 Operational Activity Model and other architectural products.

The following diagrams comprise the OV-5 Operational Activity Model:

- The A-0 diagram, which is the top-level Operational Activity Model diagram created when developing the OV-5 Activity Model. The A-0 is called the Context Diagram and is composed of a single activity box with a name that encompasses the entire scope of the Enterprise being described.

The A-0 uses ICOM Arrows entering and leaving this box to represent interfaces of the Enterprise to its external environment, and those ICOMs are then carried down to subsequent child diagrams. A text box shall be added detailing the Purpose and Viewpoint of the Model.

- The A0 diagram, which is a child diagram of A-0, and decomposes the single upper-level context activity into two to nine child activities. The A0 diagram is recognized as the primary diagram of an OV-5 model, clearly showing the high-level DoD activities.

**Note:** While IDEF0 conventions suggest that a given Activity Model diagram shown comprise no less than three or more than six activities, BEA requirements have necessitated this variation in the degree of decomposition for a Parent Activity.

- The A1 set of diagrams, which are children of the A0 and decompose a single A0 Operational Activities into two to nine sub-activities. The OV-5 Operational Activity Models and the Operational Activities contained within them must be decomposed to a level that supports the BEP, as necessary to answer questions (required outcomes). If the level of decomposition does not clearly show how it supports a particular BEP capability, then the Operational Activity must be decomposed to expose the capability. The ICOMs attached to the activities must be at the level of detail reflecting the level of Operational Activity to which it is attached.

Each of the Enterprise-level OV-5 models shall have viewpoint and purpose statements. These statements shall be placed in a text box on the A-0 diagram.

Each Diagram in the OV-5 Operational Activity Model shall have a diagram description. The description shall describe the activities displayed on the diagram, the main themes characterizing their interactions, as depicted by ICOMs. Specific ICOMs should not be named, but the general type(s) of information contained within the ICOMs or the LRP or Systems represented by them should be included in the Diagram description.

## ICOMs

The ICOMs are the means by which information and relationships between Operational Activities are represented on the OV-5 Operational Activity Model diagram(s). Many other architecture products use or refer to these ICOMs therefore, it is imperative that ICOM names be representative of the business information they represent.

To identify and define ICOMs for the BEA OV-5 Operational Activity Model:

- Create the Inputs and Outputs on the appropriate OV-5 diagrams.  
**Note:** For Inputs and Outputs that originate from or go to Entities that are external to the BEA, develop generic external activities such as “Process Treasury Information”, and populate the checkbox identifying the activity as external in SA. This activity will then be assigned as a source or destination to the appropriate ICOM.
- Define Inputs and Outputs. The definitions for said Inputs and Outputs should include a consumable-oriented noun.
- Identify External Controls. These originate outside the BEA and will be decomposed from the *Laws, Regulations and Policies* parent Control.
  - External Control definitions related to LRPs are generated by a macro through the mapping of LRP to Process Steps in the LRP Repository, which are then mapped to Operational Activities. The macro creates the ICOM definition with a naming convention of {*Operational Activity Name*} *Law Policy Reg*; if a leaf-level Operational Activity is not mapped to an OV-6c Process Step then that Operational Activity will have the Parent Control “Law and Regulation and Policy”. The OV-5 Architect will then add the Control to the diagram going into the appropriate activity.



- External Initiatives are decomposed from the Laws, Regulations and Policies Control. For the definition of these external initiatives, the definition should include control-oriented noun that indicate elements of control and not performance or consumption.
- Identify Internal Controls. These Controls, generated by an activity within the BEA OV-5 Activity Model, will follow the same naming conventions as Inputs and Outputs, not the external LRP Control.
- In conjunction with SMEs, identify and link Mechanisms to Operational Activities in the OV-5 in accordance with which CBM and the System or Initiative, if possible, that would perform the assigned Operational Activity. As defined in section 5.1.4, Mechanisms are the Systems or CBMs that actually perform some part of the Operational Activity and not just send or receive information to/from the activity.
- Create IEs from Input and Output ICOMs associated to leaf-level Operational Activities, but not Internal Controls. The ICOM Arrow shall be linked to the created IE in the SA tool.
- General rules for adding ICOMs to diagrams:
  - Each Operational Activity will have one or more Inputs or Controls.
  - Each Operational Activity will have one or more Mechanisms.
  - Each Operational Activity will have one or more Outputs.

### **ICOM Bundling**

To Bundle ICOMs for the BEA OV-5 Operational Activity Model:

- ICOM bundles will be created based upon the source and destination of ICOMs or to increase the functional understanding of the diagram. No changes will be made to the leaf-level diagrams except to add parent ICOMs with appropriate ICOM Arrow forks and joins to connect the leaf-level ICOMs to their parent. Parent ICOMs are not shown if they were decomposed at a higher intermediate level of the activity model. Assign child ICOM to the parent ICOM.
- Identify A0 Level ICOMs that come from the same external node or go to the same external node that may be bundled. The A0 Level parent ICOM shall be decomposed in one or more intermediate level parent ICOMs, determined by the destination activities on each intermediate level of the Operational Activity model. For all other ICOMs (used by a BEP or between BEPs), a single ICOM will be created to bundle multiple ICOMs with the same source and destination Operational Activity.

#### **5.2.2.1.3 OV-5 Diagram/Model Coordination with the Stakeholders**

The business analysts will closely review any changes made to any other BEA products and assess the impact of such changes on the OV-5. Products of particular concern, because of their close alignment with the OV-5 are the OV-6c and the SV product System Functionality Descriptions, specifically the SV-5. Changes to the OV-6c Process Steps may require definition modifications in Operational Activities or remapping of Process Steps. Changes to System Functions may require corresponding changes to Operational Activities or definitions since Systems are Mechanisms and are represented in the SV-1 and SV-5, while changes to the Data Objects or System Data Exchanges (SDEs) may require changes to ICOMs. The OV-5s are linked to other products and those linkages are listed in Section 0, Relationship to Other BEA Products.

Changes to the FEA BRM could also result in changes to the OV-5. The business analysts will do periodic reviews of the FEA BRM to determine what changes have been implemented. Changes to Lines of Business and Sub-functions in the FEA BRM are assessed for the need to make corresponding changes to Operational Activities in the OV-5. At the very least, each such change to the FEA BRM requires changes to definitions of Lines of Business or Sub-functions maintained in SA and to existing linkages between these definitions and Operational Activities.

To ensure proper integration across products, a thorough analysis must be conducted with all products and definitions that impact the OV-5. Mappings from or to OV-5 Operational Activities must be validated.



The following subsections describe specific linkages that must be established for the BEA, and how those linkages are implemented using the SA tool.

### **Linking Operational Activities to Business Capabilities**

Each CBM will identify a set of Business Capabilities. A Business Capability is defined as a realistic, tangible, measurable, and performance dependent outcome of one or more collaborations among people, processes and activities through utilization of technologies to maximize the effectiveness and efficiency of the warfighter.

Stakeholders review the definitions of designated Business Capabilities along with definitions of leaf-level Operational Activities to determine if the Activities address it. Multiple leaf-level Operational Activities can be mapped to the same Business Capability. Leaf-level Operational Activities should not be mapped to multiple Business Capabilities.

### **Link OV-6c Process Steps to Activities**

This task uses a SA utility to map BPM Processes to Operational Activities. These linkages will be identified during OV-6c workshops with the appropriate SMEs in attendance. Once the correct mappings are identified, the tab on the Operational Activity definition will be filled in.

### **Link FEA BRM Sub-functions to Operational Activities**

This task uses the SA utility to map FEA BRM Sub-functions to leaf-level Operational Activities, as follows:

- Assign new FEA BRM Sub-functions to Operational Activities, in collaboration with appropriate SMEs.
- Assign new Operational Activities to existing FEA BRM Sub-functions
- Reassign Operational Activities to deleted FEA BRM Sub-functions.

### **5.2.2.2 Diagram Model Clean-up**

This activity is used to provide analysis/review support to the final delivery of OV-5 models and modeling objects. The products are assessed via numerous tools and checklists to uncover discrepancies.

### **Operational Activity Node Tree**

During the Architecture Validation review period, as defined in the E2E (End to End) Process, the Node Tree is validated against the following:

- BEP AV-1
- BIP
- CR Content Summary
- Product Checklists
- Relevant Business Architecture Reporting Tool (BART) reports
- Encyclopedia Compare Reports
- Threads Tool Report

### **Operational Activity Model**

During the Architecture Validation review period, as defined in the E2E (End to End) Process, the OV-5 Operational Activity Model is validated against the following:

- BEP AV-1
- BIP
- CR Content Summary

- Product Checklists
- Relevant BART reports
- Encyclopedia Compare Reports
- Threads Tool Report

### 5.2.3 Post-Development Tasks

These tasks are done after the work has been approved by the stakeholders:

- Incorporate additional updates to the OV-5 based upon subsequent work sessions.
- Incorporate quality control and architecture verification changes into the BEA.
- Incorporate additional stakeholder updates based on their review.
- Incorporate additional CIO updates based on their review

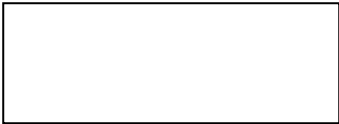
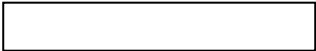

## 5.3 Modeling the OV-5 Product Using SA

### 5.3.1 OV-5 Modeling Conventions

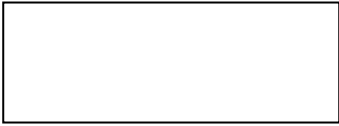
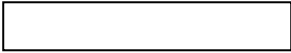

The following modeling conventions shall be used to create an efficient and effective OV-5:

#### 5.3.1.1 Use of Color, Size and Lines in a Diagram

Table 5-1, Modeling Guidelines for Operational Activity Node Tree

Element	Symbol	Format
Doc Block	Text Box: 	<i>Position: Upper Left Corner</i> <i>Border: Solid Black</i> <i>Fill: None</i> <i>Text:</i> <i>Color: Black</i> <i>Font: Arial</i> <i>Size: Default</i>
<i>Operational Activities</i>	<i>Rectangle:</i> 	<i>Border: Solid Black</i> <i>Fill:</i> <i>Operational Activity on Node Tree Only:</i> <i>Light Blue</i>  <i>Operational Activity on OV-5 Models:</i> <i>White</i> <i>Text:</i> <i>Color: Black</i> <i>Font: Arial</i> <i>Size: Default</i>

**Table 5-2, Modeling Guidelines for Operational Activity Model Diagrams**

Element	Symbol	Format
Doc Block	Text Box: 	Position: Upper Left Corner of Diagram Border: Solid Black Fill: None Text: Color: Black Font: Arial Size: Default
Operational Activity	Rectangular textbox: 	Border: Solid Black Fill: Color: Yellow Text: Color: Black Font: Arial Size: Default
ICOMS	Straight Arrow Connectors: 	Color: Solid Black Width: SA Default Additional restrictions: ICOM Arrows should not intersect.

### 5.3.1.2 Diagram Conventions

#### Operational Activity Node Tree

- There is only one Enterprise-level OV-5 Operational Activity Node Tree diagram for the BEA in the SA encyclopedia.
- The Operational Activity Node Tree Diagram shall include a diagram description that shall be stored in the Description attribute under Diagrams Properties.
- All modeling objects shall have no truncated entries on the diagram.
- If a parent Operational Activity is decomposed on the diagram, it shall be decomposed to at least two, but no more than nine, child Operational Activities.
- The Operational Activity box label shall use title case (first letter of each word capitalized, other letters lowercase) should be non-plural (exception approved by BTA), and can use only the special character “-”. Any acronyms used in the Operational Activity name must be from the approved acronym list that is part of the BEA AV-2. New Acronyms will be added to the Acronym list in the AV-2.
- The Operational Activity box label shall fall within the Operational Activity box border when printed.
- The Operational Activity box label shall not contain truncation indicators (dots) indicating that text is not visible.
- Operational Activity box labels and definitions shall be identical to those used in the OV-5 Operational Activity Model.
- The Operational Activity box numbers shall be sequential. Each Operational Activity node number will be assigned based on the position of the box within the model and will be generated

automatically by SA. The Operational Activity numbers shall be prefaced by the capital letter “A” and will be shown at the beginning of the Operational Activity box label.

- Operational Activities must have a definition that is clear, concise and uses active voice. The definition must cover the type of information coming in (not specific Inputs), what the activity does with that information and identify the Controls that impact the Systems (if identified) that perform that activity, and what information it produces. It should also discuss major and minor flows of the activity as well what triggers the performance of the activity.
- Use the “Stakeholders” tab on the Operational Activity definition in SA to assign CBMs and BEPs that have an interest in the Activity.
- The top box of the diagram shall be centered (as permitted by the tool) on the diagram.
- A Doc Block representing header information for the diagram (including the diagram name and date last updated) shall be placed in the upper left-hand corner of every diagram with no white space above or to the left of the Block. This Doc Block shall contain the title of the diagram and other pertinent information as automatically provided by the SA tool. No graphic comment shall be included. The Doc Block shall be enlarged so there are no truncation indicators (dots) indicating that text is not visible. The Doc Block shall be a box with no fill color and a black border.

### Operational Activity Model

The following guidelines shall apply to the OV-5 Activity Model diagrams:

- All modeling objects shall have no truncated entries on the diagram.
- A Doc Block representing header information for the diagram (including the diagram name and date last updated) shall be placed in the upper left-hand corner of every diagram with no white space above or to the left of the Block. This Doc Block shall contain the title of the diagram and other pertinent information as automatically provided by the SA tool. No graphic comment shall be included. The Doc Block shall be enlarged so there are no truncation indicators (dots) indicating that text is not visible. The Doc Block shall be a box with no fill color and a black border. For each diagram below the A-0, the Doc Block shall have gray shaded areas on the left and right side indicating a parent relationship to the activity diagram above it.
- The Operational Activity Model shall have a top-level A-0 Context Diagram consisting of a single Activity Box, labeled A0, with associated boundary ICOM Arrows representing appropriate interfaces with Activities outside the model.
- Each OV-5 diagram must be associated with an Operational Activity Node on the Operational Activity Node Tree.
- In the Operational Activity Model diagrams at the A0, A1, and A11 levels (and subsequent levels as necessary), Operational Activity boxes shall be arranged in a stair-step fashion from the upper left corner down to the bottom right corner of the page. The top of any subsequent Operational Activity must be below the *top* (not the *bottom*) of the previous Operational Activity.
- For each Diagram in the OV-5, a text description shall be written to provide a clear, understandable narrative of what the Diagram portrays. The narrative shall describe the Operational Activities and their information interactions in general, both internal to the diagram and external. The diagram description should also attempt to discuss the main themes of the diagram by following the critical ICOMs and their relationships to activities as shown in the diagram interactions, as well as the minor themes by following other ICOM interactions.

- During workshops, Operational Activity definitions shall be refined to reflect ICOMs. It must address the information received, what action is performed on that information, what regulations constrain the Operational Activity and what Outputs are produced by the Operational Activity.

### 5.3.1.3 Object Naming Conventions

- Operational Activities shall be named as verb-noun objects. They should represent succinct expressions of what the Operational Activity does, suitable to the level of Operational Activity decomposition. The Operational Activity Names must be unique and use only approved acronyms, as contained in the BEA AV-2. For new acronyms, the acronyms must be noted and passed to the AV-2 product team lead for inclusion in the product.
- The only special characters allowed are “-” and “ ‘ ”.
- Use Title Case; the first letter of each word in an object name shall be uppercase; other letters should be lowercase. Incidental words, such as prepositions within the object name (“with,” “at,” “in,” “and” or “the”), shall be all lowercase.
- Object names shall use the singular form (no plurals) with exceptions approved by the Chief Architect.
- Object names shall be spelled correctly and shall not use future tense.

## 5.3.2 Modeling OV-5 Objects

The following subsections provide guidelines for the individual elements or components that comprise the Operational Activity Model Diagrams.

### 5.3.2.1 Operational Activity

- All Operational Activities must be defined. Definitions should reflect the information transformation, creation and consumption actions performed by the Operational Activity. Each definition must be clear, concise, use active voice, and comprise complete, grammatically correct sentence.

Example of a good Operational Activity definition:

**Manage Entitlement:** This activity includes calculating the amount to be paid as a result of a commercial vendor having provided materiel or services to the Department of Defense. The activity verifies funding availability for payment along with conducting a three-way match between the contract, the receiving report, and the certified invoice. The activity also applies any outstanding debt, such as a credit, for monies owed to a federal, commercial, and DoD entity against open invoices. The activity calculates interest and discounts in accordance with the contract and the Prompt Payment Act and generates a Certified Business Partner Pay file with the applicable banking information, which is sent to a disbursing activity.

- The Operational Activity label shall begin with a RETURN so that the label does not touch the upper border of the Operational Activity Box (required for SA text formatting).
- The Operational Activity box label must fall within the Activity box border when printed.
- The Operational Activity box border shall be a solid black line.

- The Operational Activity box numbers must be sequential. The Operational Activity Box numbers shall be positioned in the lower right corner of the Operational Activity box.
- Operational Activities are mapped to one or more CBMs and BEPs that have a stake in that Operational Activity.
- Leaf-level Operational Activities will be associated with a BRM Sub-function(s) where appropriate.
- All Operational Activity modeling decompositions must follow the “2 to 9 Activity box” rule with the exception of the top-level A-0.

### 5.3.2.2 ICOMs

- All ICOMs shall be defined. All ICOM definitions shall be consistent with the level of decomposition of the Activity. The definition of the Parent ICOM shall include the list of child ICOMs.
- An ICOM Arrow cannot connect to the same Operational Activity more than once.
- Definitions shall be complete enough to support linkage of ICOMs to attributes and synonyms in the OV-7 through IEs. If the ICOM supports IEs at the Attribute level then its definition needs to be narrow enough to enable the IE to contain a finite set of Attributes supporting specific Data Initiatives. Each Input and Output shall have at least a one-for-one relationship with an IE unless there are additional Information Exchanges, Data Objects and SDEs associated to the ICOM.

Examples of good ICOM definitions:

(Input) **Returned Payment Notice**: This is a notification that a previously issued payment has been returned and the reason(s) why. The payment was returned for at least one of the following reasons: invalid account number, invalid routing transcript number, account closed, or rejected by payee.

(Output) **Wire Transfer Information**: Information that is provided to the U.S. Treasury for the wire transfer transaction. Information could include payee's name, bank account and routing number, amount of transfer and transaction date.

(Mechanism) **DTS**: The Defense Travel System (DTS) transforms what is currently a paper-based, labor-intensive travel process into a fully automated and web-based system that will support official travel. When fully implemented, DTS will be the designated single standard system for temporary duty travel requirements for all DoD personnel.

- For the definition of an internal control, the definition should use control-oriented nouns that indicate elements of control and not performance or consumption.

Example of a good Internal Control definition:

**ESOH Control Requirement**: This is the required set of operational controls implemented by a mission activity to comply with environment, safety, and occupational health legal, regulatory, policy and performance requirements. The controls take the form of terms and conditions established by

agreement between stakeholders such as the owner or operator of the mission activity; supporting environment, safety, and occupational health organizations; permitting agencies; and the public. A documented terms and conditions agreement might be a: process authorization, permit, license, exemption, explosives safety site plan and management decision or operating exception. Environment, safety, and occupational health controls influence the doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) of mission activities. They may also define standard operating procedures, specify safety requirements, detail experience levels and training requirements, prescribe monitoring and reporting requirements, or specify other required activities.

- ICOM names shall be consistent with their assigned Operational Activity box name and definition and names shall be unique within the model.
- ICOMs shall be linked to each CBM and BEP that has a stake in or uses that ICOM.
- Internal ICOMs (on the same diagram) shall have two 90-degree curves rather than be a straight line between two Operational Activity Boxes. The internal ICOM labels shall be placed on the horizontal line where it is the most legible.
- The vertical line segments for multiple child ICOMs must align exactly and have a clean connection line to the parent ICOM Arrow.
- If the label of an Input or Output ICOM is too long for the line or interferes with branch points, it shall be wrapped to two lines only.
- An Output of an Operational Activity cannot go into that same Operational Activity as an Input without changing the ICOM name and definition.
- Boundary ICOMs come from (Input, Control) or go to (Output) one boundary location.
- An ICOM Arrow on a diagram that is connected to multiple Operational Activities shall be drawn from a common source ICOM or to a common destination ICOM. The ICOM name shall be displayed once.

### 5.3.2.3 ICOM Bundling

ICOM bundling refers to creating ICOMs of higher levels of abstraction as parents of a number of more detailed child ICOMs. Grouping similar ICOMs together, either by type or by their relationship with a producing and consuming Operational Activity creates the bundles. Bundling is used to reduce the number of ICOMs on the A-0, A0, or A1 Activity Model diagrams and to keep ICOM detail consistent with that of the Activities at a given diagram level. Bundles represent the more detailed ICOMs shown on the lower-level diagrams, and are derived from other information sources relevant to the information dependency between Activity Boxes on a given OV-5 Activity Model diagram.

The bundling process is done bottom-up. The rule is to only form these higher-level ICOMs when absolutely necessary, and restrict it by a “type of” or “part of” rule. If the original lower-level ICOM is sufficient at its level of abstraction for the higher-level diagram, it should be left unchanged. Otherwise, a higher-level ICOM for which the lower-level ICOM is a part or a type should be created and connected to the appropriate Operational Activity box. The following modeling conventions apply to ICOMs:

#### Inputs

- Input ICOM labels shall be left justified above the ICOM Arrow, closest to the boundary.

- Input boundary ICOMs must originate as a horizontal line from the left diagram boundary.
- Child Input ICOM labels should be placed above the horizontal line where most legible, preferably close to the using Operational Activity.
- When a child ICOM is drawn, or decomposed from a parent boundary ICOM, that ICOM and all siblings shall be attached at the same spot on the parent ICOM and connect to their appropriate Operational Activity. The ICOMs shall align vertically with each other.

### **Outputs**

- Output ICOM labels are right justified above the ICOM Arrow and closest to the boundary.
- Output boundary ICOMs must terminate as a horizontal line at the right side of the diagram far enough way from the activity boxes that the labels can be legible. The Output ICOMs must align vertically with each other.
- Child Output ICOM labels should be placed above the horizontal line where most legible, preferably close to the producing Operational Activity.
- When a Child ICOM is drawn and attached to a parent boundary ICOM, said ICOM and all its siblings shall attach to the same spot on the parent ICOM and connect from the appropriate Operational Activity. The ICOMs shall align vertically with each other.

### **Controls**

- Controls shall be bundled into one of the following high-level Controls, which will appear on the A-0 in descending stair-step order from left to right:
  1. Laws, Regulations and Policies
  2. Information Assurance
  3. Data Initiatives
- Control ICOM labels shall be positioned to the right and at the top of the Control ICOM Arrow. Control ICOMs originate as a vertical line above the first Activity Box (top right) on an OV-5 Activity Model Diagram. (An Output that becomes a Control shall be shown starting as a horizontal line coming from the left boundary and then turning down with the arrow terminating at the top of an Activity box.).
- A maximum of 12 Controls are allowed per Operational Activity box.
- Controls are drawn as a stair-step with the tallest Control on the left and the shortest on the right side of the Operational Activity box.

### **Mechanisms**

- Mechanisms shall be assigned from the bottom up and will only be attached to the Operational Activity if they perform all or part of the activity being performed in the activity and not just support the activity by sending information. Mechanisms will be assigned to the leaf or lowest, level Operational Activities first, and will then be balanced upward into parent diagrams. The Mechanism will attach to the parent boundary Mechanism either on the leaf-level diagram or the parent diagram.
- The following high-level Mechanisms are the parents for all lower-level Mechanisms in the OV-5, and are shown on the A-0 diagram:
  1. Core Business Mission
  2. System and Initiative
- Each Operational Activity is associated with at least one Mechanism.



- A maximum of 12 Mechanisms are allowed per Operational Activity box.
- Mechanisms shall be arranged in descending stair-step order with the tallest Mechanism on the left. (This is an exception from IDEF0, which calls for Mechanisms to be drawn from the right to left).
- Mechanism ICOM labels shall be positioned to the right and at the bottom of the Mechanism ICOM Arrow. If the Mechanism is decomposed from a parent Mechanism and there are 90-degree turns in the ICOM Arrow, the Mechanism label shall be along the horizontal line closest to the arrowhead.
- Mechanisms shall originate as a vertical line below the first Operational Activity box on the OV-5 Operational Activity Model Diagram. When child Mechanisms are decomposed from the parent, there will be two 90-degree turns in the Mechanism to attach the Mechanism to the appropriate Operational Activity box.

#### **ICOM Balancing**

- All ICOMs in the OV-5 Operational Activity Model diagrams should be balanced (that is, if you have an Input to an Operational Activity at a parent-level diagram, then that same Input will appear as a boundary Input on the child diagram). If that Input is to be decomposed, then the child Input(s) will be pulled out at the lower-level model.
- If an Operational Activity Box has a child diagram, each arrow connected to the parent box shall appear on the child diagram.

#### **Information Exchange**

- Every leaf-level Operational Activity Input and Output ICOM has at least one associated IE.
- All IEs shall have the same name, definition and CBM /BEP tag as the corresponding ICOM unless there are multiple IEs supporting Data Objects and SDEs.
- Each IE must be linked in the SA tool to the corresponding ICOM.
- Mechanism and Control ICOMs shall not be mapped to an IE.

### **5.3.3 OV-5 Best Practices**

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### **5.3.3.1 OV-5 Lessons Learned**

The following lessons learned have been and serve as the basis for the Ov-5 on Appendix B:

- Operational Activity Node Tree must be stabilized before OV-5 diagram modeling can begin.
- All internal Operational Activities must be tagged with a CBM and a BEP.
- All internal leaf-level Operational Activities must be associated with a BRM Sub-function.
- All External Operational Activities must be specified and tagged as being external.
- All leaf-level Operational Activities must be specified as such.
- All leaf-level Input and Output ICOMs must be defined and their sources or destinations must be explicitly specified.
- Parent-child ICOM linkages on diagrams must be clear and consistent.
- OV-5 diagrams should be balanced across associated Operational Activity diagrams.

- Standard color coding of diagrams during the workshop is useful for participants to identify where content was added, changed or deleted. Standard color coding should be in line with that used in the BEA Compare reports.
- All exception reports must be reviewed and resolved.

### 5.3.3.2 OV-5 Common Pitfalls

The following are common mistakes in the use of SA that could affect the development lessons learned have been and also serve as the basis for the OV-5 Checklist on Appendix B:

- ICOM Arrows cross each other unnecessarily
- ICOM Arrows not touching Operational Activity Boxes
- Ineffective use of diagram space
  - Activity boxes too large or too small
  - ICOM connections unclear
  - Diagram overly dense or too spread out
- Inappropriate color coding of diagram objects
- Incorrect bundling of ICOMs on diagram
- Activities that do not match the level of decomposition of their ICOMs
- Truncated text on ICOMs
- Operational Activity diagrams description not properly defined
- Operational Activity and ICOM definitions do not conform to guidance
- Incorrect use of acronyms

## 6 OV-6a – Operational Rules Model

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### 6.1 Summary Description

This section describes the OV-6a Operational Rules Model, its relationship to other BEA Products, the development method and the modeling guidelines to be followed.

#### 6.1.1 Product Purpose

The OV-6a specifies operational or business rules that are constraints on an enterprise, a mission, operation, business, or architecture. For example, while other OV products (e.g., OV-1, OV-2, and OV-5) describe the structure of a business—what the business can do—for the most part, they do not describe what the business **must** do, or what it **cannot** do. [DoDAF 1.5]

The OV-6a Operational Rules Model is the set of operational rules that constrain an Enterprise, mission, operation, business, or architecture. For the BEA, the operational rules are called “Business Rules.” Business Rules are required in the BEA to fulfill the DoD business mission; describing what the business must do and cannot do. Business Rules define or constrain some aspect of the business.

The BEA distinguishes between a Business Policy/Guidance and Business Rules. The distinctions are based on the following definitions of a Business Policy/Guidance and Business Rules as derived from *Object Management Group's Semantics of Business Vocabulary and Business Rules v1.0* and *DoDAF 1.5*.

1. Business Policy/Guidance is different from Business Rules in that, Business Policy/Guidance is:
  - Less structured
  - Less discrete or not atomic
  - Less carefully expressed in terms of a standard vocabulary
  - Not directly enforceable
2. Business Rules are different from Business Policy/Guidance in that, a Business Rule:
  - Uses structured language and notation
  - Is atomic and unambiguous
  - Uses a standard vocabulary
  - Is directly enforceable

The BEA OV-6a, Operational Rules include a concept of “Business Rule Category” to distinguish between two categories of Business Rules; Operative Business Rules and Structural Business Rules. Operative Business Rules are those that constrain the dynamic aspects of an enterprise. Structural Business Rules are those that constrain the static aspects of an enterprise. The Operative Category of a Business Rule has a Type of either Derivation or Action, both of which can potentially be violated or ignored. The Structural Category of a Business Rule has a Type of Relational or Definitional, both of which are constraints that must be imposed. Examples are presented in the following sections.

There is a difference between the definition of a Business Rule and notation in which the Business Rule is written. This is similar to the difference between the definition of a Process Model and BPMN. Business Rule notation is a technique used to write Business Rules in a consistent way such that the Business Rule is atomic, unambiguous, uses a standard vocabulary, and is directly enforceable. While the APG specifies *RuleSpeak™* as the Business Rule notation, there are earlier written Business Rules that do not conform to *RuleSpeak™* notation.

The development of Business Rules is an art rather than a science. It requires close collaboration between the Stakeholder SMEs and the Business Rules Team to create Business Rules that provide clear unambiguous guidance. There are few fixed guidelines that can be applied. One of the sources used as a guideline is the methodology developed by Ronald G. Ross and Gladys S.W. Lam, internationally acclaimed experts of Business Rule techniques and methodology. This methodology is documented in Ross's book *Business Rule Concepts: Getting to the Point of Knowledge* (2<sup>nd</sup> ed. Business Rule Solutions, LLC, 2005).

## 6.1.2 Product Structure

The OV-6a is a textual product in the form of definitions. The OV-6a is manually created. Refer to Section 6.1.4 for the required fields for the Business Rules to make the definition complete. Each Stakeholder can have an unlimited number of Business Rules within the BEA SA encyclopedia.

## 6.1.3 Relationship to Other BEA Products

OV-6a is related to other BEA products as follows:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the OV-5 is affected in the release.
<b>AV-2</b>	All OV-6a terms with specific meaning must be included in the AV-2. These terms must include, as a minimum, all object types included in the deliverable.  All acronyms used in OV-6a descriptions must be listed and spelled out in the AV-2 Acronyms Definitions list.
<b>OV-2</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and the OV-2.
<b>OV-3</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and the OV-3.
<b>OV-5</b>	While DoDAF 1.5 maps Operative Action Business Rules to the OV-5 Activities, the BEA does not use direct links of Business Rules to the OV-5.
<b>OV-6c</b>	Operative Action Business Rules are mapped to, and help to define, the BPM Processes in the OV-6c Business Process Diagram.  Operative Derivation Business Rules are mapped to, and help to define, either BPM Processes, and/or Data Objects in the OV-6c Business Process Diagram.  Structural Business Rules are mapped to, and help to define, Data Objects in the OV-6c Business Process Diagram.
<b>OV-7</b>	Structural Business Rules constrain the structure and validity of Data Elements and may be captured in the Logical Data Model (OV-7). The structure of the Entities, Attributes, and Relationships must be consistent with the Business Rules.  <b>Note:</b> Currently, in the BEA, Business Rules do not map directly to the Entities, Attributes, and Entity Relationships. Instead, Structural Definitional Business Rules are directly mapped to specific OV-7 Data Elements supporting enterprise systems and initiatives; in this case, the system or initiative must be identified in the "Initiatives" field.
<b>SV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and the SV-1.
<b>SV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and the SV-5.

<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and the TV-1.
<b>DFMIR/FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and the DFMIR Guidance Model.

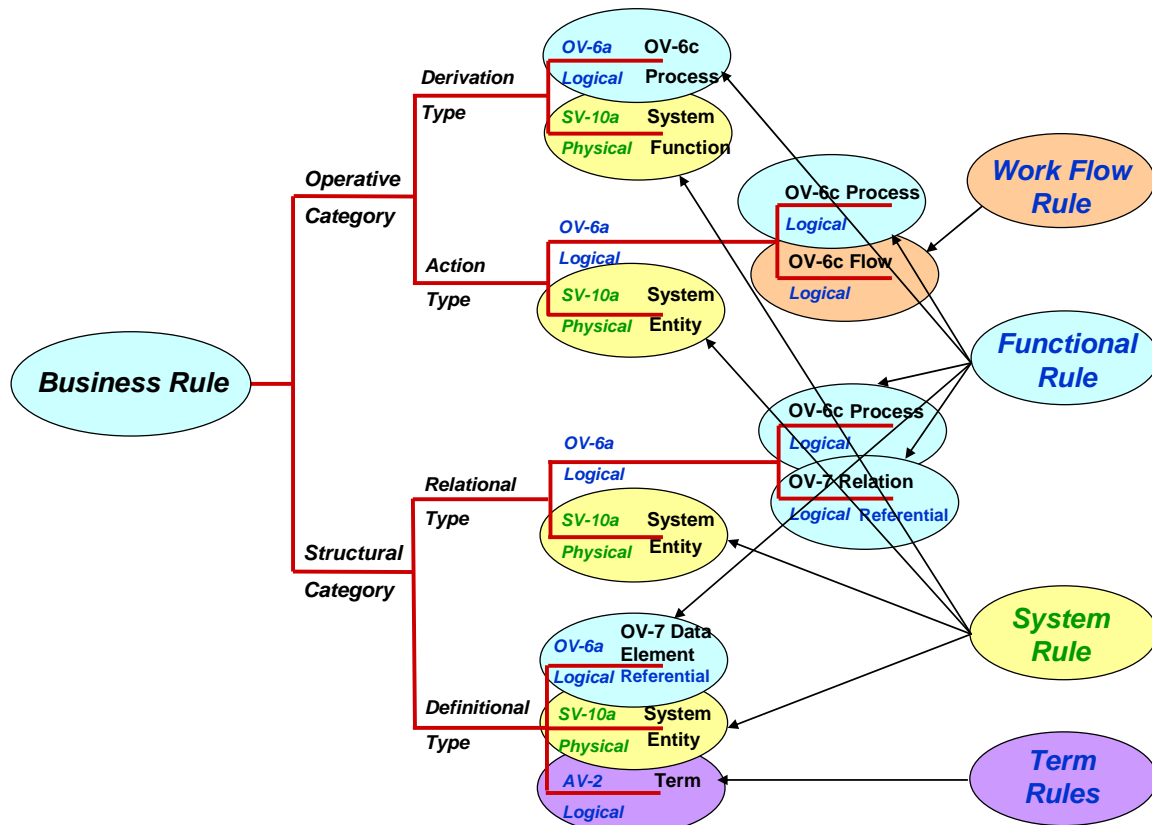
## 6.1.4 OV-6a Product Definitions

### 6.1.4.1 OV-6a Mapping Decision Tree

The current version of the BEA does not include DoDAF SV-10a System Rules. The primary difference between the OV-6a and the SV-10a is that the OV-6a Business Rules denote “logical” constraints while the SV-10a System Rules denote “physical” constraints; thus, the BEA products to which they are mapped are different.

Figure 6-1 is a decision tree that guides the mapping of OV-6a Business Rules to the appropriate BEA product. For completeness and consistency, the decision tree includes the logic for both OV-6a and SV-10a mappings in anticipation for future inclusion of the SV-10a System Rules into the BEA. A complete decision tree helps in deciding the correct placement of the Business Rule.

Figure 6-1, OV-6a BEA Product Mapping Decision Tree



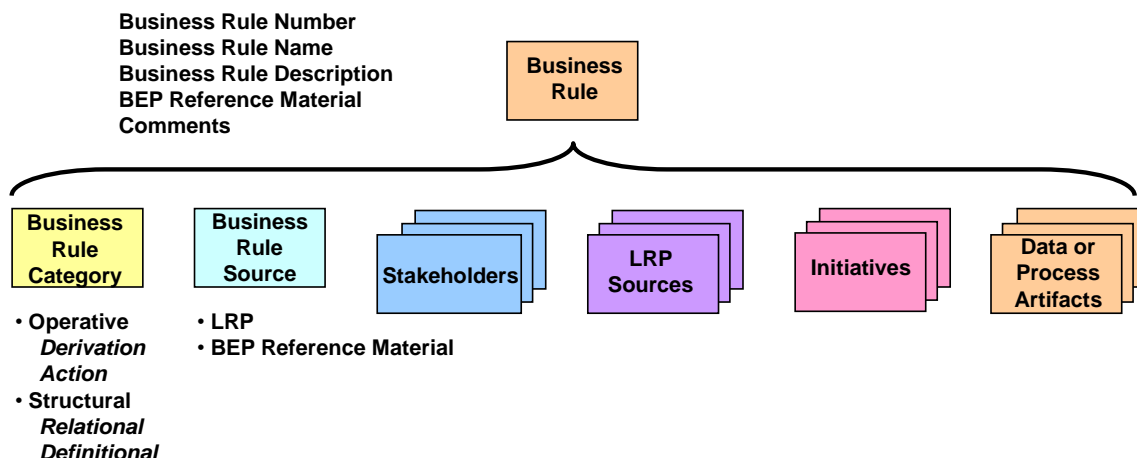
The OV-6a mappings are indicated by the color blue to differentiate them from the SV-10a mappings in the color yellow. There are two groups of OV-6a mappings, Business Rules and Workflow Rules. Business Rules are constraints imposed by the business activities, while Workflow Rules are constraints that sequence business processes. Term Rules are the definitions of the terms used by the rules. The above decision tree is based on the Business Rule Mantra: “**Rules are built on Facts. Facts are built on Terms.**”

### 6.1.4.2 OV-6a Field Definitions

This section defines concepts and terms often used when discussing Business Rules. DoDAF terms are not repeated. Refer to DoDAF, Volume 2, Section 4.6, for the OV-6a Operational Model terms.

Figure 6-2, Data Fields and Structure of a Business Rule, shows the structure of a Business Rule and lists the eleven (11) associated data fields. As described in further detail below, five of the data fields are text entry, two of are single list selections, and the remaining four are multiple value list selections.

Figure 6-2, Data Fields and Structure of a Business Rule



1. **Business Rule Number:** A mandatory text data field for the unique number manually assigned to a Business Rule for identification purposes. The following are examples of correct Business Rule Numbers:

- 50048
- 50049

The Business Rule Number should be sequentially assigned within the BEA Release number as shown above. That is, the BEA Release is “5.0” and the sequential numbers are “48” and “49”. This assignment technique allows all of the new Business Rules for a BEA Release to be easily identified.

2. **Business Rule Name:** A text entry field for the unique name assigned to a Business Rule for identification purposes. The Business Rule Name is limited to 80 characters and consists of concatenated terms separated by underscores (\_). A term can be either alphabetic or numeric. The Business Rule Name must begin with an alphabetic term. Initial uppercase is used for each alphanumeric term, unless it is an acronym. The Business Rule Name is used to map to other architecture artifacts such as a BPM Process. An example of a Business Rule Name is:

“Payment\_Request\_Approval\_1”

3. **Description:** A text entry field for the Business Rule set forth as a statement of constraint or permission with respect to a process and/or data. It may be stated at any level but should be stated at an appropriate level of detail consistent with the process level. Examples of Business Rule Descriptions are given in a following Business Rule Category Section.
4. **BEP Reference Material:** An optional text entry field in which to store relevant Business Rule source information. This is the recommended field to store Derivation sources. This field usually contains hyper-links to the referenced source material.

5. **Comments:** An optional text entry field for use of Stakeholders. For example, the stakeholder may decide to list related Operational Activities here
6. **Business Rule Category:** A single list selection field for defined Business Rule categories to assist in mapping the Business Rule to the OV-6c Business Process Diagram and the OV-7 Logical Data Model. Listed categories include:
  - **Operative Derivation:** A Business Rule that reflects computational or derived aspects of the mission or business and specifies constraints of a BPM Process or Sequence Flow in the OV-6c Business Process Diagram. It must have a mapping to a BPM Process or Flow. The following is an example of a correct Operative Derivation Business Rule:

**Operative Derivation Business Rule Description:**

The *Fee Amount* must be calculated by multiplying the *Fee Rate* by the number of *Days Late*.

**Note:** The underscored terms in the above description must be added as Terms in the AV-2.

- **Operative Action:** A Business Rule that reflects dynamic aspects of the mission or business and specifies constraints of a BPM Process or Sequence Flow in the OV-6c Business Process Diagram. It must have a mapping to a BPM Process or Flow. The following is an example of a correct Operative Action Business Rule:

**Operative Action Business Rule Description:**

A *Library Card* must be used to check out a *Book*.

**Note:** The underscored terms in the above description must be added as Terms in the AV-2.

- **Structural Relational:** A Business Rule that reflects static aspects of the mission or business terms and facts. Structural Assertion Business Rules may result from important structural assertions graphically represented in the OV-7 Logical Data model due to BEA Compliance Assessment requirements. It must have a mapping to the BPM Process which enforces the rule. This rule could have a mapping to the OV-7 Logical Data Model. The following is an example of a correct Structural Relation Business Rule:

**Structural Relational Business Rule Description:**

(BPM Process) A *Contract* must have one or more *Line Items*.

**Note:** The underscored item in the above description must be defined as Terms in the AV-2.

**Structural Relational Business Rule Description: (OV-7 Relation)**

A *CONTRACT* must have one or more *LINE-ITEMS*.

**Note:** The underscored item in the above description must be defined as Entities with a Relationship in the OV-7 Logical Data Model.

- **Structural Definitional:** A Business Rule that reflects static aspects of the mission or business terms and facts. Structural Definitional Business Rules may result from important structural definitions graphically represented in the OV-7 Logical Data model due to BEA Compliance Assessment requirements. It must have a mapping to a Data Element. The following is an example of a correct Structural Definitional Business Rule:

**Structural Definitional Business Rule Description:** (Data Element)

A Zip Code must have exactly nine numeric characters.

**Note:** The underscored item in the above description must be defined as a Data Element.

**Structural Definitional Business Rule Description:** (AV-2 Term)

A Contract is an agreement between two or more parties whereby each party promises to do, or not to do, something.

**Note:** The underscored item in the above description must be defined as a Term in the AV-2.

7. **Business Rule Source:** A single value list selection field that indicates the source of the Business Rule.
  - **LRP:** The origin of this type of a Business Rule is a law, regulation, and/or policy applicable to a particular business process and/or system.
 

**Note:** When the Business Rule Source is “LRP”, the Business Rule must be mapped using a valid LRP Source Identifier.
  - **Reference Material:** The origin of this type of a Business Rule is the result of business transformational efforts and the need to constrain, or give permission to a System Function or System Entity. This type is not directly traceable to compliance requirements.
 

**Note:** When the Business Rule Source is “BEP Reference Material”, the “BEP Reference Material” data field must be populated with the appropriate reference citation.
8. **Stakeholder:** A multiple value list selection field to identify the owner of the Business Rule. The owner may be an individual CBM designation or a BEP designation.
9. **Initiatives:** A multiple value list selection field that designates the initiatives that the Business Rule enforces or identifies the enterprise system(s) that the Business Rule influences. Business Rules mapped directly to specific OV-7 Data Elements must have the enterprise system or initiative they support identified here.

The following is a valid example of an Initiative:

SFIS: Standard Financial Information Structure

10. **LRP Sources:** An optional multiple valued data field that contains a link to the specific Law, Regulation or Policy in the LRP Database. The LRP Sources are selected from a list of available LRP Sources.
11. **Data or Process Artifacts:** A multiple value list of valid SA data or process artifacts to which Business Rules are related.



### 6.1.4.3 OV-6a Input Field Capture

This section describes capturing the Business Rules field values for inserts or changes to the System Architect encyclopedia.

#### 6.1.4.3.1 Input Document

The primary input document is a spreadsheet that has the following four tabs:

1. Main Load
2. LRP Sources
3. BEP Stakeholders
4. BPM Processes

The Main Load tab contains all of the above single entry fields as columns. That is, the fields for which there is only one value; such as the Business Rule Definition.

The other three tabs contain the fields for which multiple occurrences are possible; for example, a Business Rule can be mapped to more than one BPM Process. The map between the Business Rule and the other BEA artifact is the Business Rule Name. The following is an example of entries in the BPM Process tab.

**Table 6-1, Example of a BPM Process Tab**

<b>BPM Process Name</b>	<b>Business Rule Name</b>
Manage Financial Management Policy	Audit_Trails_9
Manage Financial Reporting	Deferred _Maintenance_And_Cleanup_Costs_1
Manage Financial Management Policy	Deferred _Maintenance_And_Cleanup_Costs_1

The LRP Sources and the BEP Stakeholders tabs have the same construct as the above. This input document is also used as a “turn around” document for reviews between the OV-6a Team and the stakeholder.

#### 6.1.4.3.2 System Architect Update Process

There are two basic System Architect update processes, based on the volume of the update. A large update volume requires assistance from the System Architect Build Team using a spreadsheet provided by the Business Rule Team as input to an automated procedure. A small update volume is manually entered into System Architect by the Business Rule Team.

#### 6.1.4.3.3 Mapped Field Validation

The mapped field names must be correct, otherwise errors will be generated and the Business Rule will not be complete.

The System Architect Build Team automated load procedure automatically inserts artifacts as new objects when a match is not found. For example, an incorrect BPM Process name in the load sheet will cause a new BPM Process to be added with that name and may result in incorrect mappings. This is an error that must be manually corrected. Consequently, care must be taken to ensure that the mapped names are valid and already exist in System Architect.

The same applies for LRP Sources; however, this is a benefit because no manual effort is required to update the BEA LRP Source list. The LRP Sources should be verified before the load to ensure that they are valid.

## 6.2 Developing the OV-6a Model

This section describes the approach used by the Business Rules Team to develop the OV-6a Operational Rules model. The Business Rules Team works with stakeholders and functional SMEs to produce Business Rules that support the business transformation. This process includes development, maintenance and retirement of Business Rules.

## 6.2.1 Pre-Development Tasks

In general, each stakeholder has their own process to identify Business Rule concepts for inclusion into the OV-6a Operational Rules model. The Stakeholder may request the assistance of the Business Rules Team during pre-development work, such as: providing general guidance on how to develop content; answering questions regarding form and structure; or generating and analyzing System Architect reports from the previous BEA release. This process for Business Rule creation does not require detailed analysis of the architecture. The Stakeholder provides the Business Rules Team their identified Business Rule concepts mapped to an architectural object for pre-analysis.

## 6.2.2 Development Tasks

### 6.2.2.1 Refine Business Rules Concept

The following steps refine the Business Rule concept.

- Develop the concept into a form ready for functional review.
- Refine the Business Rule to meet the project's BEA/DoDAF standards.
- Confirm that the proposed Business Rule concept does not duplicate an existing rule.
- Analyze the concept for accuracy and potential conflict with existing Business Rules.
- Determine the Business Rule Category.
- Refine the Business Rule concept by applying the *RuleSpeak*<sup>™</sup> guidelines to ensure the proposed language of the Business Rule meets the BEA standards.
- Determine the Business Rule Category Type and Business Rule Source Type.
- Develop the Business Rule Name.
- Assign the OV-6a Operational Rules Model unique Business Rule Numbers.
- Forward the proposed Business Rules to the Business Rule Team Lead for technical review.

### 6.2.2.2 OV-6a Operational Rules Model Coordination with Stakeholders

Each Business Rule is passed back to the Stakeholders for a functional review after the technical review by the Business Rules Team Lead. The Stakeholders verify that the proposed Business Rule conveys the same idea as the original Business Rule concept. If the proposed Business Rule passes the functional review, the Stakeholders return it to the Business Rules Team for pre-load verification. If the proposed Business Rule does not pass functional review, the Stakeholders return it to the Business Rules Team for further refinement. In that case, the Business Rules Team uses Stakeholder comments to refine the Business Rule concept. The Stakeholders and Business Rules Team work closely to achieve a consensus on a functionally and technically solid Business Rule.

### 6.2.2.3 OV-6a Operational Rules Load Preparation

After the validity of the Business Rules has been agreed, the Business Rules are ready for the load into the BEA. The Business Rules Team creates the load sheet, which is an MS Excel spreadsheet that lists the Business Rules and all associated fields discussed in 6.1.4 Definitions. This load sheet is submitted to all of the Stakeholders for approval through the designated End-to-End Process Workshops. After the load sheet has been approved, the Business Rules Team submits the load sheet and a copy of the approved CR to the SA Build Team. The Business Rules Team can manually input the approved Business Rules into System Architect. This is normally done when the Business Rule volume is less than twenty Business Rules.

If a Business Rule does not successfully pass the Stakeholders final approval stage, the Business Rules Team works with the Stakeholders towards final approval.

After the Business Rule is loaded into SA, the Business Rules Team verifies that the load sheet is correctly represented in the BEA. This step must wait for the SA Build Team to perform an Encyclopedia update so that the Business Rules Team can conduct the Post-Build Verification on the latest Encyclopedia build. If the Business Rules Team discovers a discrepancy at this point, he or she works with the SA Build Team to correct it.

#### 6.2.2.4 Creating/Modifying the OV-6a Products

To ensure that the Business Rules remain valid, the Business Rules Team follows a maintenance and retirement process. The Stakeholders notify the Business Rules Team that there is a change in the BEA affecting existing Business Rules. The Business Rules Team identifies the Business Rules and makes any necessary adjustments in System Architect. Next, the Business Rules Team analyzes the architecture for potential changes to the existing processes and other linkages in System Architect. Finally, the Business Rules Team validates the above Process for continued support of the business transformation. The following discusses the maintenance process in detail:

##### 6.2.2.4.1 Identify Business Rules

Either the Stakeholders or Business Rules Team may initiate an analysis to determine if changes are needed. A number of circumstances may trigger a change to some aspect of the Business Rule and/or its artifacts. Below are typical (but not an inclusive list of) triggers:

- Business Objective change
- Process Step change
- Information Exchange / Data Object / SDE change
- Requirement change
- LRP Source change

**Note:** If a LRP Source Identifier or description already mapped to a Business Rule changes in the LRP Repository (DOORS database), the LRP team will notify the Business Rules Team and/or the Stakeholders. The Business Rules Team will manage the change in System Architect.

##### 6.2.2.4.2 Analyze Potential Changes

Once the change is identified, the Business Rules Team conducts analysis to determine any potential impacts on the BEA. The analysis includes impact to other architectural products, existing Business Rules and/or requirements.

##### 6.2.2.4.3 Validate Business Rule Changes

The Business Rules Team hands off the Business Rule for technical review to the Business Rules Team Lead. After completing technical review, the Business Rules Team works with the appropriate Stakeholders for functional approval.

##### 6.2.2.4.4 Update System Architect

Upon approval, the Business Rules Team makes the changes in System Architect or creates a load sheet to present to the Build Team for automated loading.

### 6.2.3 Post-Development Tasks

As with the Business Rule maintenance process, a number of Events may trigger the retirement process, such as:

- A Business Objective change or elimination
- BPM Process modification or elimination
- LRP Source change or elimination

The Stakeholders notify the Business Rules Team that a Business Rule needs to be retired. The Business Rules Team, working closely with the Stakeholders, documents the reason for retirement, and then the Business Rule is retired from the SA encyclopedia. Finally, the appropriate validation steps are executed to ensure that the Business Rule was actually retired.

**Note:** The Stakeholders review each Business Rule identified for retirement, verifying whether it is appropriate to retire the Business Rule for all Processes. If a Business Rule, identified for retirement, still has a valid mapping to another Process Step, the Business Rules Team retains the Business Rule, removing only the link to the retired Process Step.

The following discusses the retirement process in more detail:

#### 6.2.3.1 Identify Obsolete Business Rule

The Stakeholders are responsible for identifying a Business Rule that needs to be retired. In addition, if an architecture object deletion or change is the trigger, the Stakeholders identify whether each instance of the Business Rule must be deleted or just the mapping between the Business Rule and the architecture object being changed.

#### 6.2.3.2 Retire Business Rule

The Business Rules Team removes the identified Business Rule from SA. The Business Rules Team also identifies to the LRP team a retired Business Rule that has a LRP Identifier associated with it. If the Business Rule is still valid, and possesses valid mappings to other architecture objects, the Business Rule Team removes only the prescribed mapping.

#### 6.2.3.3 Validate Business Rule Retirement

The Business Rules Team SME conducts the appropriate quality assurance checks. These checks validate the appropriate retirement of a Business Rule and prevent the creation of orphan Processes and Data Elements.

## 6.3 Modeling the OV-6a Product Using SA

### 6.3.1 OV-6a Modeling Conventions

Guidelines that assist in the identification and definition of Business Rules are:

- Each Business Rule must have a unique Business Rule Name. The Business Rule Name format is described in Subsection 6.1.4 of this document.
- Each Business Rule must be assigned a unique Business Rule Number by which it can be identified.
- Each Business Rule must have a unique Description. The Description is the actual Business Rule.
- Each Business Rule must have a Stakeholder. The Stakeholder may be an individual BEP designation or a CBM designation.
- Each Business Rule must be classified into only one of two Business Rule Categories: Operative or Structural.
- Each Business Rule of the Operative Category must be typed as either Derivation or Action.
- Each Business Rule of the Structural Category must be typed as either Relational or Definitional.
- Each Business Rule must be associated with only one of two Business Rule Sources: “LRP” or “BEP Reference Material”.
- Each Business Rule with a Source of “LRP” must be associated with one or more LRP authoritative sources. The LRP Source Identifier is the unique identifier from the LRP Repository (DOORS) database.

- Each Business Rule includes an optional Comment field for use of the CBM, BEP, or Stakeholder(s).
- Each Business Rule includes an optional BEP Reference Material field. This field is used to store information the BEP considers relevant for the Business Rule. For instance, the BEP may include the title of a Requirement Document Regulation and/or policy with a Hypertext Markup Language (HTML) link to the original document. The BEP may also include a list of related Operational Activities.
- Each Business Rule may be optionally associated with an integration Stakeholder. The Stakeholder designation must be from the approved Stakeholder acronym list.
- Each Structural Business Rule can have a mapping to a Data Element, a Relation in the OV-7 Logical Data Model or a BPM Process. However, each Structural Business Rule is currently only mapped to a Data Element.
- Every Operative Business Rule must have a mapping to at least one BPM Process and/or decision Flow in the OV-6c Business Process Diagram.
- Each Structural Business Rule mapped to any OV-7 Data Element must be associated with the Enterprise System or Initiative it supports in Initiatives field.
- Each LRP Source Identifier must be associated with a unique Identifier from the DOORS database.

### 6.3.2 Modeling OV-6a Objects

- A clear understanding of the OV-6c Business Process Diagram and OV-7 Data Elements must come before OV-6a development.
- BEP OV-6a content that affects other BEPs should be socialized before the workshop.
- Prior to the workshop, the fields associated with a Business Rule, like Source Type and OV-6c Business Process Diagram mapping, should be socialized with the BEP Coordinator and Team Lead to ensure these mappings are captured, in addition to the content of the Business Rule.
- Ensure acronyms are spelled out in AV-2.
- A Business Rule that has a source of a “LRP” must have a LRP Source Identifier associated with the Business Rule.
- A Business Rule must be mapped to an object in the OV-6c Business Process Diagram or OV-7 Logical Data Model.
- Ensure all exception reports have been reviewed and resolved.

### 6.3.3 OV-6a Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 6.3.3.1 OV-6a Lessons Learned

- A clear understanding of the OV-6c Business Process Diagram and OV-7 Data Elements must come before OV-6a development.
- BEP OV-6a content that affects other BEPs should be socialized before the workshop.
- Prior to the workshop, the fields associated with a Business Rule, like Source Type and OV-6c Business Process Diagram mapping, should be socialized with the BEP Coordinator and Team Lead to ensure these mappings are captured, in addition to the content of the Business Rule.
- Ensure acronyms are spelled out in AV-2.

- A Business Rule that has a source of a “LRP” must have a LRP Source Identifier associated with the Business Rule.
- A Business Rule must be mapped to an object in the OV-6c Business Process Diagram or OV-7 Logical Data Model.
- Ensure all exception reports have been reviewed and resolved.
- Validate the existence of SA mapped names using spread sheet macros such as VLOOKUP. This helps reduce errors in the load process.

### **6.3.3.2 OV-6a Common Pitfalls**

- Ambiguity.
- Embedding term definitions in Business Rules (Use AV-2 to define terms).
- Over-explaining or adding unrelated information.
- Subject is neither quantified nor singular (e.g., by using the word “each”).
- Compound statements (“and” or “or”)
- Conditional Business Rules not in the “If...,then...” format.
- The result of a computation is not subject of a Business Rule with the Business Rule Category of Derivation.
- The logical structure of the Business Rule makes does not make sense.
- Contradictory or redundant Business Rule description.

## 7 OV-7 – Logical Data Model

## 7.1 Summary Description

This section describes the OV-7 Logical Data Model, its relationship to other BEA products, the development method and the modeling guidelines to be followed.

### 7.1.1 Product Purpose

The OV-7 Logical Data Model describes the structure of the BEA's data in terms of data types as Entities and their characteristics as Attributes. It provides wide definitions of the Entities and their Attributes and captures BMA structural Business Rules governing the interrelationships between these Entities and their Attributes.

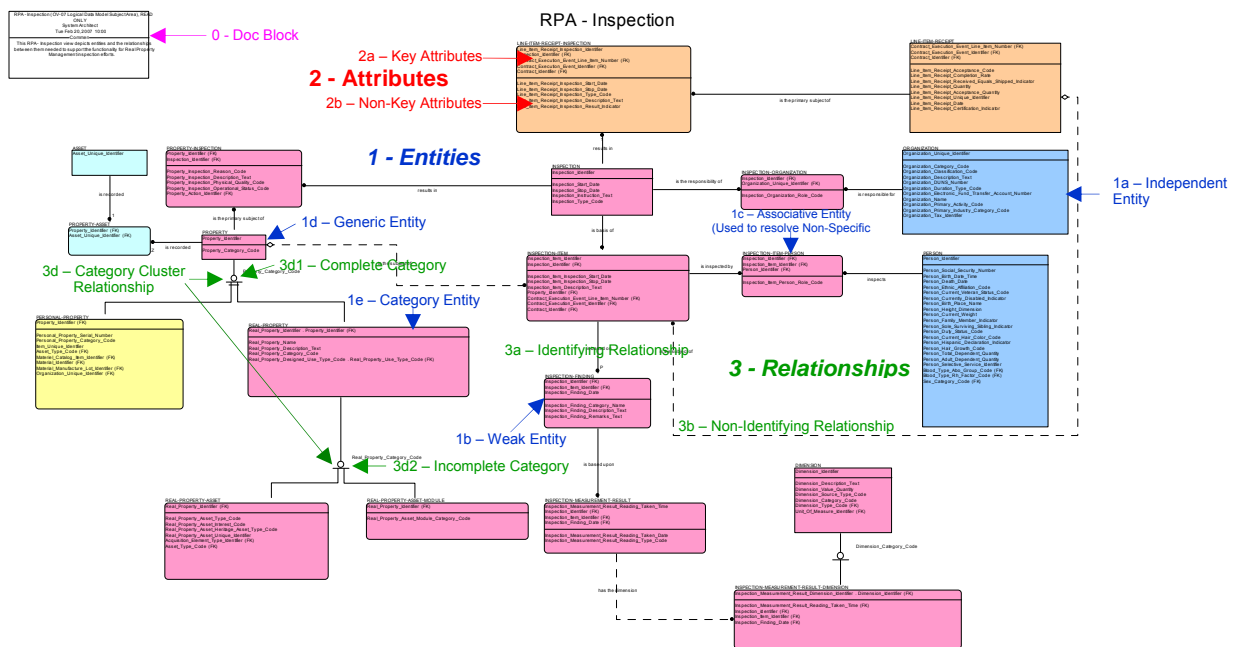
The OV-7:

- Enables effective management of data resources by providing a single set of consistent data definitions for use within the DoD BMA.
- Captures the Business Rules describing the structure of data needs within the DoD BMA.
- Serves as data reference architecture to support the sharing of data between DoD BMAs, across the DoD Components, Services and Agencies and organizations outside DoD.

### 7.1.2 Product Structure

The OV-7 product is depicted as a set of diagrams. Figure 7-1, Example of an OV-7 Logical Data Model represented within BEA, is an illustrative example of an OV-7 Logical Data Model used within BEA. Each individual OV-7 diagram represents a particular BEP's view into the single OV-7 data model integrated across the entire DoD BMA.

Figure 7-1, Example of an OV-7 Logical Data Model represented within BEA



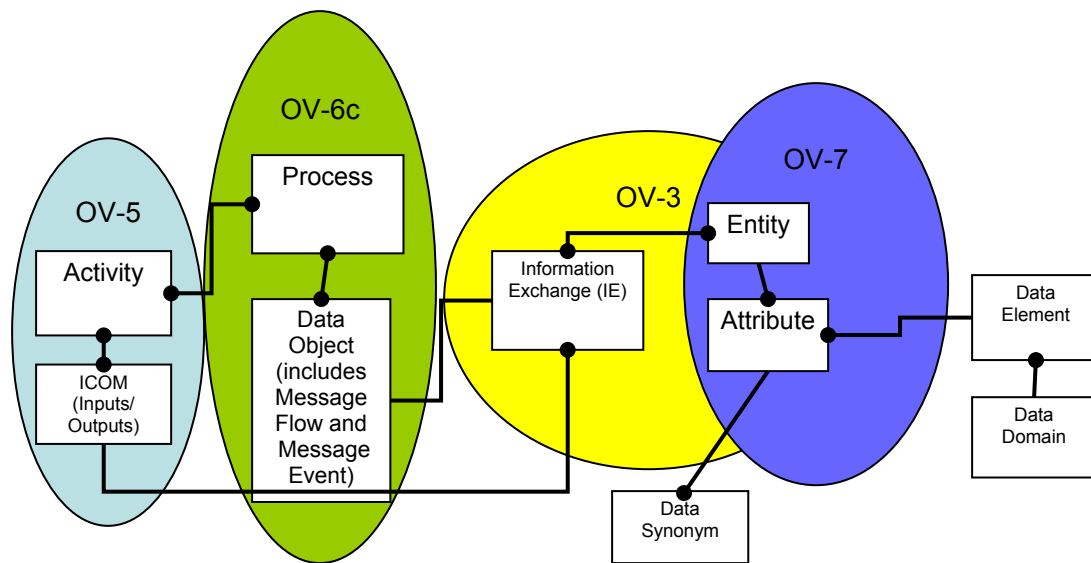
### 7.1.3 Relationship to Other BEA Products

As illustrated in Figure 7-2, the OV-7 is related to other BEA products as follows:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the OV-7 is affected in the release.
<b>AV-2</b>	<p>All OV-7 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.</p> <p>The OV-7 deliverable objects that must be listed and defined in the AV-2 are:</p> <ul style="list-style-type: none"> <li>• Attribute Definitions</li> <li>• Data Element Definitions</li> <li>• Data Domain Definitions</li> <li>• Domain Permitted Value Definitions</li> <li>• Entity Definitions</li> </ul> <p>All acronyms used in OV-7 names and descriptions must be listed and spelled out in the AV-2.</p>
<b>OV-2</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and the OV-2.
<b>OV-3</b>	One or more OV-7 Entities link to IEs in the OV-3, describing the IEs in terms of the Entities that comprise it. Each Entity in the OV-7 must link to one or more IEs. If the IE is sufficiently narrow and it supports a Data Initiative, then it may be populated with Attributes within Entities. Note: Data Synonyms are not part of the OV-3
<b>OV-5</b>	Entities in the OV-7 support the Inputs and Outputs on the OV-5 via the IEs in the OV-3.
<b>OV-6a</b>	<p>Business Rules in the OV-6a may constrain the structure and validity of elements of the OV-7. The structure of the Entities, Attributes and Entity Relationships must be consistent with the Business Rules.</p> <p><b>Note:</b> Business Rules in the BEA do not link directly to the OV-7 Entities, Attributes and Relationships. Instead, Business Rules may be linked directly to specific Data Elements supporting enterprise systems and initiatives.</p>
<b>OV-6c</b>	OV-6c Data Objects (including Message Flows and Message Events) inherit their characteristics from the OV-3 Information Exchanges as outlined above.
<b>SV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and the SV-1.
<b>SV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and the SV-6.
<b>SV-6</b>	The SDEs represented in the SV-6 inherit their OV-7 characteristics from the OV-3 Information Exchanges as outlined above.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and the TV-1.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and the DFMIR Guidance Model.



Figure 7-2, Relationships between OV-7 and Other BEA Products



To successfully implement a BIP requires coordination with all impacted Stakeholders. The Architecture Development Team is responsible for ensuring the complementary depiction across all BEA products and that all product specific content is properly integrated with all other BEA Products.

### 7.1.4 OV-7 Product Definitions

The following are definitions of the key elements contained in the OV-7. The objects used to represent the OV-7 within BEA adhere to the IDEF1x Standard as implemented by the Telelogic System Architect tool. The following numbered objects refer to Figure 7-1, Example of an OV-7 Logical Data Model represented within BEA. The main features of this diagram are as follows:

- **Doc Block (0)**, also known as a Title Block, contains the diagram name, last modification date and a brief description of the contents of the diagram. It is located in the upper left corner of the diagram.
- **Entities (1)**, each refers to a unique person, place, or thing about which the DoD BMA CBMs desire to maintain information. In the context of an Entity, a thing may be either physical or conceptual (an event, a deed, an idea, a notion, a point, etc.). This information captured is on the characteristics of an Entity and/or on relationships between Entities.

Each Entity represents a set of things having common characteristics and/or relationships to other Entities. The characteristics of each Entity are represented as having a common set of Attributes. The types of Entities are as follows:

- **Independent Entity (1a)**, also known as an Originating, Parent or Generic Entity, is an Entity that does not rely on another Entity for identification.
- **Dependent Entity (1b)**, also known as a Weak or Child Entity, is an Entity that relies on another Entity for identification.
- **Associative Entity (1c)**, also known as an Intersection Entity, resolves a Non-Specific (many-to-many) Relationship between Entities.
- **Generic Entity (1d)**, also known as a Supertype Entity, it is an abstraction representing the common characteristics in a set of Attributes shared by two or more Category (Subtype) Entities.

- **Category Entity (1e)**, also known as a Subtype Entity, represents additional characteristics that differentiate it from the other Category Entities of the same Generic (Supertype) Entity.
- **Attributes (2)**: Characteristics that either identify or describe Entities. Attributes that identify Entities are key Attributes. Attributes that describe an Entity are non-key Attributes. Attributes are associated to one and only one Entity and represent the normalized view of Data Elements within OV-7 Entities.
  - **Key Attributes (2a)**: Attributes that are used to identify Entities as well as describe Entities. Key Attributes uniquely identify an instance of an Entity.
  - **Non-Key Attributes (2b)**: Attributes that are used to describe Entities.
- **Relationships (3)**: In IDEF1X an Entity Relationship is simply an association or connection between two Entities. A Relationship instance is the meaningful association or connection between two Entity instances. For each Entity instance at one end, the Relationship shows the minimum and maximum number of instances possible for the Entity at the other end. Optionality describes the minimum and Cardinality describes the maximum. The types of Relationships are as follows:
  - **Identifying Relationship (3a)**: A Relationship between two Entities in which the Dependent Entity is identified through its association with another Entity.
  - **Non-Identifying Relationship (3b)**: A Relationship between two Entities in which the Attributes carried to the receiving Entity are used to describe the receiving Entity.
  - **Non-Specific Relationship (3c)**: A many-to-many Relationship between two Entities.  
**Note:** Non-Specific Relationships are not allowed in the BEA OV-7. Therefore all Non-Specific Relationships must be resolved with an associative Entity (1c).
  - **Category Cluster Relationship (3d)**: (Supertype – Subtype Relationships) is used to express a set of one or more mutually exclusive categorization Relationships for the same Generic Entity.
    - **Complete Category (3d1)**: Denotes that all possible categories are represented in the BEA Logical Data Model.
    - **Incomplete Category (3d2)**: Denotes that all possible categories are not represented in the BEA Logical Data Model.

## 7.2 Developing the OV-7 Products

The architecture development team works with stakeholders to identify the BEA data requirements. The team then captures these data requirements and structural Business Rules within the OV-7. The team participates in collaborative working sessions with stakeholders to support the BEP needs and ensures proper integration with other BEA products.

The following is a list of required background material each modeler must understand to ensure a proper OV-7 development:

- The OV-5 Inputs and Outputs inherit their OV-7 characteristics from the OV-3 Information Exchanges.
- The OV-6c Data Objects inherit their OV-7 characteristics from the OV-3 Information Exchange.
- The SV-6 SDEs inherit their OV-7 characteristics from the OV-3 Information Exchanges.
- An Information Exchange contains a finite set of characteristics from the OV-7.
- Different sets of data characteristics require the creation of unique IEs.
- Each IE relates to one or more Entities in the OV-7.

- Attribute level OV-3 Information Exchanges are the publication vehicle of data initiatives and enterprise interoperability standards used for BEA compliance. The contents of these IEs may represent a partial implementation in support of an emerging enterprise standard or data initiative.
- Attribute level OV-3 Information Exchanges may contain Data Synonyms related to their Attributes.
  - Data Synonyms are optional BEA-defined constructs used to describe Data in alternate terms familiar to the business user. Data Synonyms exist in the context of a particular Information Exchange and must be associated to one or more Attributes mapped to the same IE.
  - If stakeholder provided Data Elements adhere to the following constraints; are at the atomic level, conform to BEA standards, have agreement among all stakeholders on the name and definition; then the BEP provided Data Element is directly incorporated into the BEA or an existing Data Element is updated to reflect the new standard. The Data Element is modeled as an Attribute of one or more OV-7 Entities without the creation of any OV-3 Data Synonyms.
- Stakeholder contributed Data Models are incorporated into the BEA OV-7 Logical Data Model to support the level of decomposition of the supporting OV-5.
  - All concepts gleaned from these models must be normalized into Entities and their supporting Attributes across the entire BEA OV-7.
  - No information may be represented within the OV-7 that is outside of OV-5 activities, their supporting Inputs and Outputs and further decomposition in the OV-3 Information Exchanges.
- All Data Elements in the BEA are at the atomic level, as known and must be represented as one or more Attributes within one or more OV-7 Entities.
- Data Elements directly related to one or more Data Initiatives or enterprise interoperability standards may have a Data Domain to capture the physical characteristics, authoritative source and may contain Domain Permitted Values along with their descriptions.
- Data Domains directly related to one or more Data Elements supporting a Data Initiative may have Domain Permitted Values only if the entire set is included.

### 7.2.1 Pre-Development Tasks

Develop a thorough understanding of the scope, context, constraints, objectives and product deliverables of the BIP. The following items are the responsibility of the individual modelers assigned to each BIP:

1. Using the BEA HTML, determine existing content from the OV-5 Activity model and identify the leaf-level activities supporting the BIP. (This represents the existing scope of the BIP within the BEA.)
  - Each leaf-level activity has supporting ICOMs. Review the Input and Output ICOMs and their associated IEs in the OV-3.
  - Each OV-3 IE is supported by either one or more Entities or a specific set of Attributes within the OV-7.
  - In addition, an OV-3 Information Exchange may have Data Synonyms associated with one or more Attributes within the context of a particular Information Exchange. The contents of the Information Exchanges are depicted as one or more Entities within the single OV-7 Logical Data Model.
2. Review OV-6c Process Steps and their associated OV-6a Business Rules to determine additional constraints on the OV-7.
3. Review OV-6c Data Objects, Message Flows and Message Events and their associated OV-6a Business Rules to determine additional constraints in the OV-7.
4. Identify existing/proposed IEs in support of enterprise systems and initiatives.

5. Identify existing unresolved or deferred OV-7 Change Requests (CRs), Child and Feedback Tickets that fall within the scope of the BIP.
6. Identify existing/proposed solutions to the OV-7 CRs in support of the BIP.
7. Identify existing/proposed OV-6a Structural Assertion and Derivation Business Rules that impact the content of the OV-3 and the OV-7 as are required to achieve the desired outcome of the BIP.
8. Identify existing/proposed IEs in support of SDE in the SV-1 / SV-6 that impact the content of the OV-7.
9. Identify existing/proposed IEs in support of OV-6c Data Objects that impact the content of the OV-7.
10. Identify existing/proposed IE definitions that impact the content of the OV-7.
11. Work within the SMEs to identify proposed revisions to IEs supporting specific Data Initiatives or enterprise interoperability standard transaction sets.
12. Identify existing/proposed operational nodes and need lines required to support the data requirements between federation partners.
13. Ensure that only IEs sufficiently narrow in scope (with the correct business context to impact the target audience) are populated at the Attribute level and they directly support Data Initiatives or enterprise interoperability standards.
14. Determine all Entities required to support the BIP and capture the following kinds of Entities: the published transaction sets, their derivation rules, and referential integrity constraints necessary for the aggregation of raw data required to produce accurate and consistent transaction sets.

**Note:** For emerging Data Initiatives and enterprise interoperability standards, break the Information Exchange requirements down into atomic level data elements, compare their physical characteristics and underlying Data Domains, separate them into repeating groups, identify candidate keys and structure them into a set of one or more Entities that precisely capture the contents of the transaction set according to the rules of normalization. Compare the Information Exchange and the preliminary contents identified against existing transaction sets in the Meta Data Registry, Government and International consensus standards and determine the authoritative source for each Data Element and propose a standard transaction set to the governance authority.

15. Model an integrated straw-man representation of the BEP OV-7 that includes all items identified above.
16. Identify any individual Data Elements required for Data Initiatives.
17. Review work with the BEA OV-7 Product Lead to ensure that data products properly integrate into the OV-7 and the other products within the BEA.

## 7.2.2 Development Tasks

The development and maintenance of the OV-7 is accomplished in facilitated workshops that include Government SME participation to address content and validate results. The following subsections describe the approach used to develop the OV-7 for the BEA. Each subsection sets forth the specific tasks that must be accomplished to in each stage of the development phase. Although most of these steps are sequential, it is common to start some steps before a previous step is completed.

All of these tasks must be completed while developing the OV-7 and are all the responsibility of the individual modelers. Identify data related changes that impact the OV-7 Views, Entities, Attributes, Relationships or Data Elements. Work with the BEP representatives on the development and refinement of the OV-2 Need Lines, OV-5 ICOMs, OV-3 IEs, OV-6a Business Rules, OV-6c Data Objects, SV-1 System Interfaces and SV-6 SDEs, and ensure their proper representation within the OV-7 Logical Data Model.

### 7.2.2.1 Creating/Modifying the OV-7 Products

1. Select impacted diagrams or create new diagram(s) as required.
2. Model new/revised Entities, Attributes and Relationships to capture the SME's functional requirements and meet the objectives of the BIP.
  - Determine the level of abstraction required to successfully meet the objectives of the BIP in the context of each IE.
    - Treat conceptual requirements with Entity level Information Exchanges modeled at the highest level of abstraction available to capture the high-level or fundamental referential integrity constraints.
    - Use existing high-level Entities such as PERSON, LOCATION and DOCUMENT to cover notional requirements.
    - For emerging data initiatives and enterprise interoperability standards capture the exact contents of the transaction as approved by the governance body as a set of one or more Entities in the BEA. Populate the Data Domains and create new Data Elements as required to capture the precise physical requirements of each Attribute.
    - Model additional Entities, Attributes and Relationships required to accurately aggregate data in the Information Exchanges from BEA federation partners.
    - Apply Derivation and Structural Assertion Business Rules to both sets of Entities directly and indirectly supporting each IE.
    - Test the resulting model with SMEs to uncover requirement gaps and design flaws.
    - Adjust the model and make refinements as required.
3. To ensure that there is no duplication of Entities, their supporting Attributes underlying Data Elements (Data Domains and Domain Permitted Values), and Relationships across the single BEA Logical Data Model (OV-7), the modeler verifies that Entities:
  - Do not duplicate existing Entities within the BEA OV-7
  - Either notionally support the Entity level Information Exchanges (serves as a place holder for further concept refinements and interactions with the data initiatives and enterprise interoperability standards)

OR

  - Directly support published content of the data initiatives or enterprise interoperability standards in Attribute level Information Exchanges

OR

  - Indirectly support the Information Exchange's required Derivation and Structural Assertion Business Rules required to produce and constrain the contents associated with Attribute level Information Exchanges
4. Work with SMEs to ensure that only IEs sufficiently narrow in scope are populated at the Attribute level and that these IEs directly support data initiatives and enterprise interoperability standards.
5. Review Data Domains when identifying new Data Elements (A data element must have a single Data Domain).

6. Model new/revised Data Elements as Attributes of Entities that directly support the published content of the Information Exchanges.
7. Model new/revised Data Elements as Attributes of Entities that indirectly support the published content of the Information Exchanges (as required to capture Data Derivation and Structural Assertion Business Rules, used to populate the contents of Information Exchanges and constrain the data prior to populating each transaction. Modify assignment of Entities or Entity/Attributes pairs to IEs based on the addition and deletion of Entities and Attributes.
8. Only assign Attribute level information to Information Exchanges if they directly support the data initiatives or enterprise interoperability standards.
9. Finalize the individual Data Elements by populating the Data Domains supporting Data Initiatives or enterprise interoperability standards required for Systems Certification.
10. Assign Data Initiatives to the Data Elements.
11. Review work with SMEs, Product Lead, IV&V and Architecture Verification team to ensure that data products are properly integrated within both OV-7 and the BEA.
12. Integrate the approved work products into the BEA.
13. Validate the depiction of the content within the OV-7 with the functional SMEs.

#### **7.2.2.1.1 Diagram / Model Coordination with Stakeholders**

All of these tasks are completed in the development phase for the OV-7. These tasks are all the responsibility of the individual OV-7 Data Modelers.

- Integrate the approved work products into the BEA.
- Incorporate additional change modifications that impact the Stakeholders' data representation caused by subsequent work sessions.
- Identify subject areas and fundamental Entities for incorporation into the model from the Stakeholder-approved content.
- Ensure that all IEs have OV-7 Entities or Attributes within Entities that cover the definitions of the leaf-level Input and Output ICOMs for all activities that fall within the scope of the developmental effort. Coordinate with the OV-5 and OV-3 teams on the coordination and population of the IE. Have the mapping validated by the SMEs.
- Ensure that all IE proposed to contain Attributes are sufficiently narrow as to enable their population by a finite set of characteristics. Work within other teams to make any required adjustments to the IEs as needed.
- With OV-3 Information Exchange Data Synonyms, ensure that any Data Synonyms provided by the stakeholders cross-references the Attributes within the context of the particular IE and are represented as Attributes in one or more OV-7 Entities.
- Review work with SMEs, Product Lead, IV&V and Architecture Verification team to ensure that data products are properly integrated within both OV-7 and the BEA.

#### **7.2.2.1.2 Diagram / Model Clean-up**

- Ensure that the BEP and CBM team stakeholders agree with their representation on diagrams.
- Remove invalid and duplicate access paths that cause the display of AK1 designations in the primary key portion of Entities.
- Ensure that all Relationship lines on all OV-7 Diagrams display properly and are not hidden.
- Ensure that the associated tags of all Relationship lines are positioned properly on the diagram.

- Ensure that, at 21% zoom, all Attribute names are displayed on a single line within the Entity.
- Ensure that all Relationship lines are straight, not broken, and that all Relationship lines avoid crossing other Relationship lines whenever possible.
- Ensure that all diagram descriptions, including the text for the diagram Doc Blocks, diagram notes, diagram names, object names and object descriptions are spell checked and none are truncated.
- Ensure that all Entities are properly colored.
- Ensure that required Acronyms appear in the AV-2 and that they are defined as Terms in the AV-2.
- Ensure that words in the “Terms” list of SA are correctly and consistently represented in all object names and descriptions. Ensure that other definitions do not redefine the Terms.
- Ensure that all table names exactly match their corresponding Entity names with “\_” separating the terms instead of “-”.
- Ensure that all the primary index and access path names exactly match the Entity name followed by “\_PK” suffix.
- Ensure that the IDEF1X categorization names match the discriminator Attribute names with the removal of their class word and the replacement of the “\_” between terms with spaces.
- Ensure that all column names exactly match their corresponding Attribute names.
- Address all items in the OV-7 Product Checklist (Diagrams, Definitions and Integration).
- Ensure that the CR packet includes all necessary items.
- Remove OV-7 objects from the encyclopedia that are not shown on or associated with OV-7 Diagrams

### 7.2.3 Post-Development Tasks

1. Incorporate additional updates to the OV-7 based upon approved Child Tickets.
2. Incorporate additional updates to the OV-7 based upon approved HTML tickets.
3. Document known deficiencies to be resolved within the next release.

## 7.3 Modeling the OV-7 Product Using SA

### 7.3.1 OV-7 Modeling Conventions

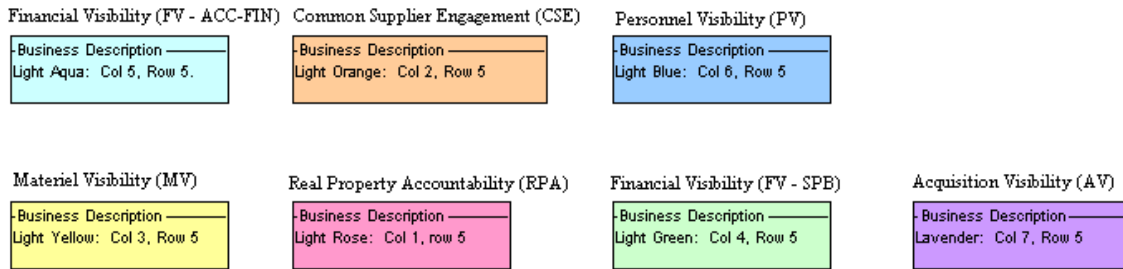
The following modeling conventions shall be used to create the OV-7. The BEA OV-7 Logical Data Model development is in accordance with the standardized modeling techniques delineated in FIPS 184 as implemented within the confines of the SA tool.

#### 7.3.1.1 Use of Color in OV-7 Diagrams

Each of the Business Enterprise Priority areas shall have a specific color scheme to be used on the diagrams for the OV-7s. The colors can be found in the Basic Color Set within Telelogic on the lower row of the color palette. The colors are applied to Entities within OV-7 Diagrams as per Figure 7-3, OV-7 BEP Color Set.



**Figure 7-3, OV-7 BEP Color Set**



### 7.3.1.2 Modeling Guidelines

The Doc Block representing header information for the diagram (including the diagram name and date last updated) is placed on the diagram.

- A Doc Block is placed in the upper left-hand corner of every diagram as close to the corner as the printer margins will permit.
- The dimensions of the Doc Block are adjusted so truncation indicators (dots) are not displayed and all text is visible.
- A black border and no fill color are selected for the Doc Block.
- Borders are not needed for the OV-7 diagram.
- Logical structures within a diagram are grouped to minimize crossing Relationship lines and to make the diagram more readable and understandable. Absent a specific reason to do otherwise, each view in the OV-7 shall display for each included Entity:
  - The name of the Entity
  - Each primary key Attribute within the Entity
  - Each non-primary key Attribute within the Entity
  - Each Relationship connected to or from the Entity
- The Title of the diagram shall include the following:
  - Be centered on the top of the diagram and in title case (determine center placement by printing single page printable diagrams on 8.5"x11" paper, and folding sheet in half side to side).
  - Not be underlined or bolded.
  - Be in Arial font with appropriate font size so the title is in proportion to all other diagrams when single page printable diagrams are printed on 8.5"x11" paper.
  - Be an exact match of the Diagram Name.
- Include for each included Entity Relationship:
  - The Relationship line and the nature of the Relationship (identified or non-identified).
  - The label (name) for at least one direction of the Relationship.
  - The Cardinality and Optionality of each end of the Relationship.
- When doing so adds value to understanding the particular aspect of the model being presented in the view:
  - One or more of the display characteristics listed above may be left out.
  - An Entity business description may be included.



- Each Entity shall have a black outline.
- Relationship lines shall be in black.

## 7.3.2 Modeling OV-7 Objects

The following guidelines are used to create or modify the OV-7.

### 7.3.2.1 Entities

Each Entity must refer to a unique person, place, thing, or concept within the Enterprise about which the Enterprise desires to and can keep information.

#### 7.3.2.1.1 Entity Names

Each Entity name must:

- Refer to the class of information, not the occurrence of the class.
- Be a singular noun or noun phrase.
- Include only uppercase alphabetic characters (A-Z) with the terms separated with dashes and no special characters (for example, BILLING-STATEMENT).
- Not contain abbreviations unless the abbreviation is extremely common or too long to be spelled out and it appears in the approved acronyms list in the AV-2.
- Not contain articles (a, an, the) or prepositions (at, by, for, from, in, of, to).

**Exception:** The article or preposition is commonly used in Business and clearly aids in identifying the concept behind the Entity.

#### 7.3.2.1.2 Entity Definitions

Each Entity must have a definition. Each Entity definition must:

- Describe the Entity in ordinary business language.
- Define what the Entity is, not how, where, or when the Entity is used, or who uses it.
- The definition should not merely restate or rephrase the name, or just provide a list of the Attributes or meta-Attributes within the Entity.
- Be precise and unambiguous. The exact meaning and interpretation of the defined concept should be apparent from the definition. A definition must be clear enough to allow only one possible interpretation. (Examples may be included to clarify the meaning.) Describe a term in such a way that it has only one meaning within its definition.
- Avoid using any word that appears in the Entity name. Instead, paraphrase or use synonyms whenever possible.
- Not be defined in terms of one Entity that is also defined in the terms of another Entity. (That is, no circular definition.)
- Describe one instance, not a group of instances. For example, begin the definition with “A” or “An.”
- Be stated in terms of the thing of interest to the business, not in terms of the information captured about the thing of interest.

#### 7.3.2.1.3 Reference Entities

A Reference Entity is one that contains a codified list of standard values as its primary key Attribute (for example, a U.S. State Code table for Virginia and Vermont). To avoid unnecessary visual clutter, a reference table will not be used except:

- When it is necessary to show additional information in the table other than name and description, or
- To provide clarity when the codified list is used in more than one place in the model, or
- Directly supports a data initiative or enterprise interoperability standard

#### 7.3.2.1.4 Entity Primary Keys

An Entity Primary key must:

- Be a natural key (not artificial) whenever possible – a natural key is one composed of Attributes that are natural characteristics of instances of the Entity.
- Be minimal – a key is said to be minimal if the removal of any Attribute would make the key not unique.
- Not have any component that is null.
- Be included on every Entity.
- Be absent of a compelling business reason; no Attribute chosen as a Primary Key should end in a class word other than Code, Date, Identifier, Name, Number, Time or (sometimes) Indicator.
- It must be recognized that common identifiers like Employee ID is a surrogate key. Other cases where a surrogate key may be used include:
  - Cases where there is no possible natural key—for example, a collection of items that creates a group of arbitrary size, but there may be two or more of the same item.
  - Cases where the Entity is an abstract concept—for example, geographic location.
  - Cases where one or more Attributes of a potential natural key could be null.
  - Cases where it directly supports a data initiative or enterprise interoperability standard.

### 7.3.2.2 Attributes

Each Attribute must describe a characteristic of its Entity. The use of a compound Attribute is not permitted. Each Attribute must:

- Represent a distinct piece of business information
- Must be associated with at least one Entity
- Be functionally dependent on the primary key

#### 7.3.2.2.1 Attribute Names

The Attribute name is a business term used to recognize the Attribute. Each Attribute Name must:

- Be a singular noun or noun phrase.
- Have all terms separated by underscores, no other special characters or blank spaces, and each term starting with an uppercase letter. For example: *Billing\_Statement\_Identifier*.
- Match exactly to its corresponding Data Element name, with the exception of Role-based Attributes used to resolve recursive relationships.
- Be in title case.
- Use only acronyms as defined in the BEA AV-2, and not plural.
- End in a Class Word represented in Table 7-1, BEA Accepted Class Words
- Not contain abbreviations or acronyms, unless they appear in the approved acronym list in the AV-2.

- Be unique, not associated with the name of another non-key Attribute, and be associated with only one Attribute description.
- Not use names of organizations, computer or information systems, directives, forms, or reports.
- Not use the possessive forms of a word (that is, a word that denotes ownership).

#### 7.3.2.2.2 Attribute Class Words

Table 7-1, BEA Accepted Class Words, illustrates class words and their definitions. A Class Word, which describes the category to which the Attribute belongs (for example, date, identifier, or quantity), must be added to the end of each Attribute's name. Abbreviations for class words may be used when appropriate.

**Table 7-1, BEA Accepted Class Words**

Class Word	BEA Definition <sup>4</sup>
<b>Amount</b>	A monetary value.
<b>Angle</b>	The rotational measurement between two lines/planes diverging from a common point/line.
<b>Area</b>	The two-dimensional measurement of a surface expressed in unit squares.
<b>Code</b>	A combination of one or more numbers, letters, or special characters substituted for a specific meaning.
<b>Coordinate</b>	One of a set of values that identifies the location of a point.
<b>Date</b>	A particular day of a calendar year.
<b>Dimension</b>	A one-dimensional measured linear distance.
<b>Flag</b>	A binary condition of two mutually exclusive options in a code set same as Indicator.
<b>Identifier</b>	A combination of one or more numbers, letters, or special characters that designates a specific object or Entity occurrence, but has no readily definable meaning.
<b>Image</b>	The two-dimensional optical counterpart of an object produced by an optical device (as a lens or mirror) or an electronic device.
<b>Indicator</b>	A binary condition of two mutually exclusive options in a code set.
<b>Mass</b>	The measure of inertia of a body.
<b>Name</b>	A designation of an object expressed in a word or phrase.
<b>Number</b>	A series of symbols, letters, or numbers used to represent a reference or identification. This is basically the same as an Identifier. It is used when number is the natural, expected, or commonly used terminating word (for example, Social_Security_Number or Disbursing_Voucher_Number).
<b>Quantity</b>	A non-monetary numeric value. This Class Word should not be used if another more restrictive Class Word is more appropriate (for example, Rate, Volume, Weight, or Dimension).
<b>Rate</b>	A quantitative expression that represents the numeric relationship between two measurable units.
<b>Temperature</b>	The measure of heat in an object.
<b>Text</b>	An unformatted character string generally in the form of words, numbers, blanks and special characters. Formatting codes can be embedded in the character string.
<b>Time</b>	A chronological point within a day.
<b>Volume</b>	A measurement of space occupied by a three-dimensional figure.
<b>Weight</b>	The force with which an object is attracted toward the earth and/or other celestial body by gravitation.
<b>Year</b>	A particular calendar year.

<sup>4</sup> Department of Defense Data Dictionary System

#### 7.3.2.2.3 Attribute Definitions

Each Attribute must have a definition. Each Attribute definition must:

- Be concise, brief and comprehensive.
- Be precise and unambiguous. The exact meaning and interpretation of the defined concept should be apparent from the definition. A definition should be clear enough to allow only one possible interpretation. (Examples may be included to clarify the meaning.)
- Avoid using any word that appears in the Attribute name. Instead, paraphrase or use synonyms whenever possible.
- Describe a singular instance, not a group of instances; thus, the definition begins with “A” or “An.”
- Explain the Attribute in terms of one value, not several values (singular form).
- Not be defined in terms of one Attribute that is also defined in the terms of another Attribute. (No circular definitions.)
- Start with what the data is, not how, where, or when the Attribute is used, or who uses the data. Subsequent parts of the definition can optionally contain the business reason that the Attribute is important to the organization.
- Use ordinary business language. Where it helps communicate the nature of the Attribute, list a few typical values.
- Use a noun phrase for the first sentence that states the essence of the Attribute. Standard English grammar, including the use of subject and verb, is appropriate for the rest of the definition.

#### 7.3.2.3 Data Element

In the BEA, a Data Element is the smallest unit of stored data, which means it cannot be broken down further, or that it makes no sense to break it down further. The Data Element, however, can inherit properties from a Data Domain. Data Elements are unique across the BMA and are associated with one or more Attributes within the BEA Entities.

- Data Elements must be linked to no more than one non-foreign key Attribute within each Entity.
- Each Data Element must represent a characteristic of a concept that is unique across the Enterprise.
- Only one Data Element may exist for a given data concept.

##### 7.3.2.3.1 Data Element Name

The name of each Data Element must:

- Always end with a class word represented in Table 7-1, BEA Accepted Class Words.
- Have all terms separated by underscores, no other special characters or blank spaces, and each term start with an uppercase letter. For example: `Billing_Statement_Identifier`.
- Be unique across the enterprise (no synonyms are allowed).
- Consist of a singular noun or noun phrase.
- Contain characters A-Z (no special characters are permitted).
- Not contain abbreviations or acronyms, unless they appear in the approved acronym list in the AV-2.
- Represent the Business Term used.
- Use the following format: Prime Word (logical grouping/category), Class Qualifier (Optional), Class Word.

##### 7.3.2.3.2 Data Element Definition

Each Data Element must have a definition. Each Definition must:

- Be concise, brief and comprehensive.
- Be precise and unambiguous. The exact meaning and interpretation of the defined concept should be apparent from the definition. A definition should be clear enough to allow only one possible interpretation.
- Describe a single instance, not a group of instances; thus, the definition begins with “A” or “An.”
- Explain the Data Element in terms of one value, not several values (singular form).
- Not be defined in terms of another Data Element. (No circular definitions.)
- Start with what the data is, not how, where, or when the Data Element is used, or who uses the data. Subsequent parts of the definition can optionally contain the business reason that the Data Element is important.
- Use ordinary business language. Where it helps communicate the nature of the Data Element, list a few typical values.
- Use a noun phrase for the first sentence; it must state the essence of the Data Element. Standard English grammar, including the use of subject and verb, is appropriate for the rest of the definition.

#### 7.3.2.4 Data Domain

In the BEA, the Data Domain represents a named and defined set of permitted values from which one or more Data Elements draw their values. A Data Domain is associated with Attributes through Data Elements. There are two kinds of Data Domains:

- **Specific Domain:** The precise set of possible values for a Data Element. Specific Domains may have Domain Permitted Values attached that reflect the entire set of values is available for publication.
- **General Domain:** A specified range of values a Data Element is permitted to have. In general, these domains are too large to be completely enumerated easily. For example: The general domain, *Date(8)*, is defined to contain any date possible, all using the same format (YYYYMMDD).

#### 7.3.2.5 Domain Permitted Values

Domain Permitted Values are the entire set of the possible values with their definitions for a Specific Domain.

#### 7.3.2.6 Data Synonym

Data Synonyms are optional BEA-defined constructs used to describe Data in alternate terms familiar to the business user. Data Synonyms exist in the context of a particular Information Exchange and must be associated to one or more Attributes mapped to the same IE.

#### 7.3.2.7 Entity Relationships

IDEF1X Entity Relationships model certain kinds of Business Rules (structural assertions). Those Business Rules describe the nature of a two-way association between potential instances of two Entities, one found at each end of the Relationship. For each Entity instance at one end, the Relationship shows the minimum and maximum number of instances possible for the Entity at the other end. Optionality describes the minimum and Cardinality describes the maximum. (The term Cardinality can also be used to describe both the minimum and the maximum, but this section of the guidelines uses separate terms as a way to distinguish the two concepts.)

If the Relationship is non-specific (many-to-many) in nature, an associative Entity must be used to resolve the Relationship. If the Relationship is not many-to-many but is optional-to-optional, an associative Entity may be used to resolve the Relationship.

To determine the set of applicable Business Rules for the Relationships in the data model for each Relationship, there are several questions that a data modeler should ask.

- What is the Cardinality of the Relationship (e.g., “one-to-many” and “many-to-many”)?

- Is the Relationship mandatory or optional in either or both directions?
- Is the Relationship identifying or non-identifying?

The general approach for managing Relationships can be summarized as follows:

- Each many-to-many Relationship (often referred to as a non-specific Relationship) is resolved by replacing it with an associative Entity. The key for the associative Entity consists of the Attributes that are the primary key for both Entities in the Relationship.
- Each optional-to-optional Relationship that carries data is resolved by replacing it with an associative Entity to carry the data.
- Each OV-7 shall include for each included Entity Relationship:
  - The Relationship line and the nature of the Relationship (identified or non-identified).
  - The label (name) from the source Entity to the target Entity direction of the Relationship.
  - The Cardinality and Optionality of each end of the Relationship.

#### **7.3.2.7.1 Relationship Label**

Each Relationship Label must:

- Be a meaningful verb phrase that is assigned to each Relationship line (e.g., “is related to” is not adequate, as the Relationship line obviously infers this Relationship).
- Match the Relationship from the source Entity to the target Entity
- Be independent of target end’s Optionality and Cardinality.
- Exist for each identifying and non-identifying Relationships.
- Be placed on each diagram:
  - As close to the Relationship line and the originating Entity as possible; or
  - Intersecting the Relationship line.
- Be specific, concise and comprehensive.

#### **7.3.2.7.2 Relationship Definitions**

Relationship definitions are not required, but may be added for better understanding of the Relationship.

### **7.3.2.8 Supertypes and Subtypes**

A Supertype is an Entity whose instances have Attributes that are common to one or more Entity Subtypes. A Subtype is an Entity that inherits common Attributes or Relationships from an Entity and contains at least one other Attribute or Relationship that distinguishes it from other Subtypes of the same Supertype.

#### **7.3.2.8.1 Subtype and Supertype Definitions**

Each Supertype Entity must:

- Be related to at least one Subtype Entity.
- Connect to each of its subtype Entities through an IDEF1X Category cluster circle.

Each Subtype Entity must:

- Have the same Primary Key as its related Supertype.
- Must have either additional Relationships and/or Attributes from the Supertype.

- Be mutually exclusive of the others in the same IDEF1X category cluster.
- Be related to exactly one Supertype Entity.

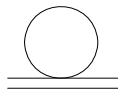
#### 7.3.2.8.2 Subtype and Supertype Naming Convention

- Each IDEF1X Categorization in the LDM shall have a name.
- Each IDEF1X Categorization name consists of a title cased singular noun or noun phrase.
- Each IDEF1X Categorization name may use hyphens between words when using hyphens in proper English construction but no other special characters.
- Each IDEF1X Categorization name uses normal business language.

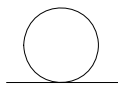
#### 7.3.2.8.3 IDEF1X Categorization Definitions

Each IDEF1X Categorization definition must:

- Be concise, brief and comprehensive
- Define the scheme that distinguishes among the related subtype Entities. It will define what the scheme is, not how, where, or when the scheme is used or who uses it.
- Indicate the relevant named subtype Entity. If a value is known, that exact value should be used to indicate the correct subtype. Otherwise, the meaning of the value must be stated clearly enough to unambiguously indicate the correct subtype.
- Must have its first sentence constructed as a noun phrase, and subsequent sentences should have normal subjects and verbs.
- Avoid using terms that appear in the IDEF1X Categorization name.
- Use the Complete Category cluster circle (double bar under a circle) if all possible categories have been identified and assigned to subtype Entities in the relevant project model.



- Use the Incomplete Category cluster circle (single bar under a circle) if fewer than all possible categories have been identified and assigned to subtype Entities in the relevant project model.



- Be assigned a discriminator from among the Attributes in the related Supertype Entity. The discriminator must have determinable values, each mapping to a maximum of one subtype Entity related to the categorization.

### 7.3.3 OV-7 Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 7.3.3.1 OV-7 Lessons Learned

- Changes in the OV-5 development (especially activity and ICOM changes) need to be closely monitored to catch potential impacts on the Entities within the OV-7.
- Monitor the changes of SV-6 SDEs for a potential impact on the OV-7 models.

- Work with the SMEs to determine the rules that govern the content of the OV-7 and explain the proposed solutions to these same SMEs to validate the model content.
- Comparison results must be reviewed and validated with functional SMEs prior to the completion of the OV-7 workshops.
- Standard color coding of diagrams during the workshop is useful for participants to identify where content was added, changed or deleted. Standard color coding should be in line with that used in the BEA Compare reports.
- All exception reports must be reviewed and resolved.

### 7.3.3.2 OV-7 Common Pitfalls

- Failure to follow the rules of normalization.
- Using a single Data Element to represent more than one Data Domain.
- Failure to map Entities and Attributes to all IEs within scope prior to the last workshop.
- Attempting to map Attributes to ill-conceived or broadly defined IEs.
- Adding Attributes to IEs that do not directly support Data Initiatives or enterprise interoperability standards.
- Adding Data Synonyms instead of specific Entities and Attributes to IEs that directly support data initiatives or enterprise interoperability standards.
- Failure to capture the published contents of Information Exchanges.
- Failure to capture the essential Business Rules used to derive and constrain Attribute level contents of Information Exchanges.
- Failure to assign stewardship to BEP and CBMs. Entity stewardship must match the Entity depiction on one or more BEP prefixed diagrams across the entire OV-7 Logical Data Model.
- Failure to justify child and subtype Entities. Each child Entity must have one Attribute that differentiates it from its parent Entity. Each subtype Entity must have at least one non-key Attribute or at least one Relationship that differentiates the subtype from the supertype.
- Inappropriate color coding of Entities. Entity color must match one of the stewards (may require placement of the Entity on additional diagrams within the OV-7).
- Use of acronyms not appearing in the acronym list and/or using an acronym without checking the official acronym definition.
- Invalid placement and formatting of OV-7 objects.
  - First, set display to 21% zoom to verify that:
    1. Truncation indicators (dots) are not displayed and all text is visible
    2. All Attributes appear on a single line
    3. All Attributes appear within Entity boxes
    4. All Relationship and categorization labels are properly placed
  - Second, repeat the first step from the single page printable diagrams on a color printer, checking plots at 8.5"x11" and 11"x17". Correct any additional diagram errors uncovered.



## 8 OV-6c – Business Process Model

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### 8.1 Summary Description

This section describes the OV-6c Business Process Model (BPM), its relationship to other BEA products, the development method and the modeling guidelines to be followed.

#### 8.1.1 Product Purpose

The OV-6c provides a sequence-ordered examination of Business Process Steps to achieve a Business Capability. The Model represents the “To Be” Operational View of a Business Process, displaying a series of business steps that are executed sequentially, or in parallel, in response to business events, to produce a specific business result.

Secondary purposes include:

- Aligning LRP requirements and Business Rules with specific Business Processes.
- Providing a basis for capital planning and assessing the value of potential investment.
- Setting the foundation for controlled, systematic transformation.
- Establishing a basis for measuring the progress toward achieving transformation objectives.
- Establishing key criteria for testing and evaluating transformation solutions.
- A Business Process should produce a measurable improvement to a product or service. If the effect of a process cannot be measured, then it would be impossible to measure its effectiveness and would also be difficult to control.
- Business Processes should be as autonomous as possible. Tightly linked activities are less flexible and harder to change.
- Business processes should add value to a product or service. If they are not doing so, then the reason for their existence should be questioned.

#### 8.1.2 Product Structure

The OV-6c product is depicted as a set of diagrams. It comprises OV-6c models that are developed using the Business Process Modeling Notation (BPMN). BPMN is a standard notation used across industry and Government to document Business Processes and is promoted by the Object Management Group. This standard has been developed specifically to model collaboration across organizations and support the implementation of a service-oriented architecture (SOA). The primary goal of BPMN is to provide a standard notation that is readily understandable by all business stakeholders; the business analysts who create and refine the process; the technical staff responsible for designing and developing the software and infrastructure to support the process; and the business managers who implement, manage and monitor it. Consequently BPMN is intended to serve as common language to bridge the communication gap that frequently occurs between business process design and implementation.

The BPMN specification, Version 1.1, used for the BEA OV-6c, is available at [www.BPMN.org](http://www.BPMN.org).

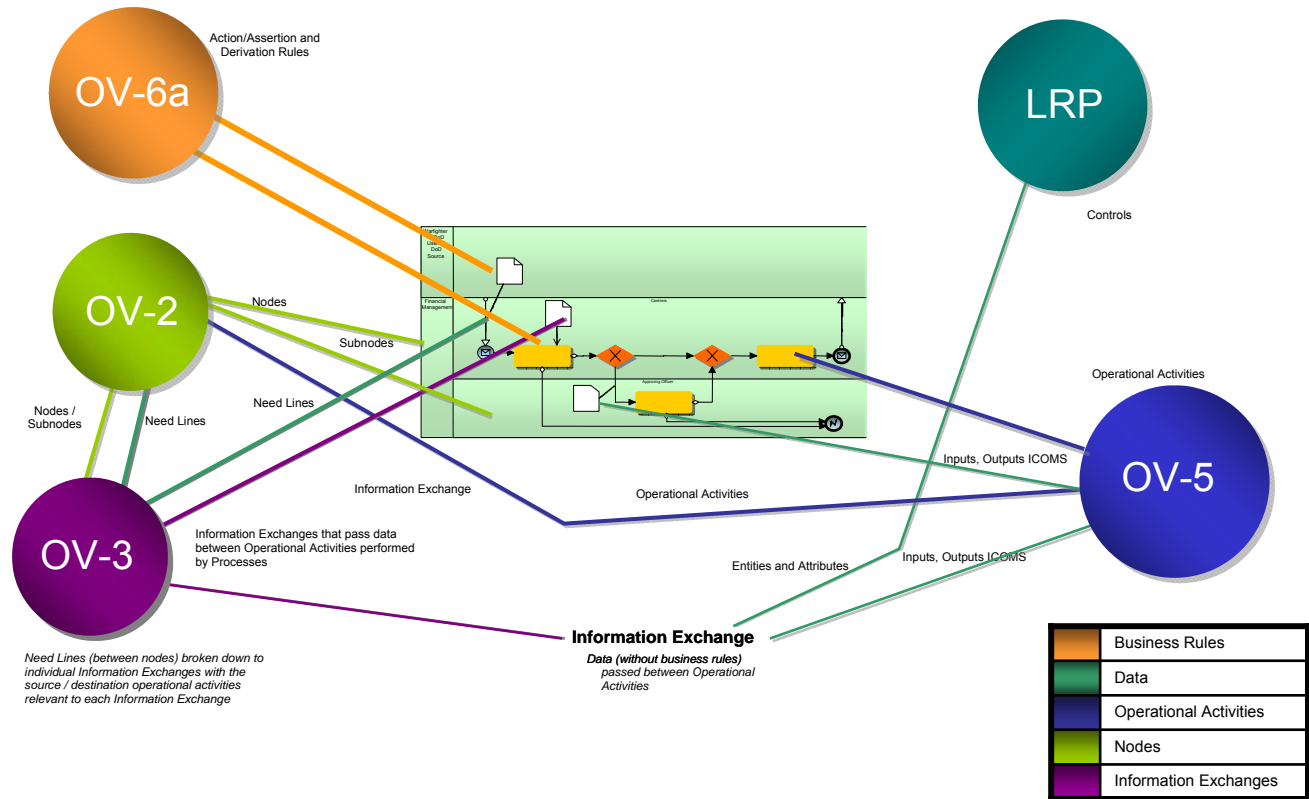
#### 8.1.3 Relationship to Other BEA Products

Integrated architectures provide a structured and organized approach for defining capabilities and understanding the underlying relationships and requirements for achieving those capabilities. The full spectrum of the business can be effectively modeled and related in the OV-6c, so that detailed analyses and decisions can be supported by describing the sequence of business activities, tying them to Operational Nodes (representing functional areas, organizations or human roles), relating them to supporting systems or System Functions, and specifying the actions, events and related guard conditions or Business Rules that constrain those activities.

Figure 8-1 depicts the linking rules and relationships among the following elements in other BEA products and the OV-6c elements. The OV-6a relates to other BEA products as follows:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the OV-6c is affected in the release.
<b>AV-2</b>	<p>All OV-6c terms with a specific meaning must be included in the AV-2 Term Definitions report. These terms must include, as a minimum, the following object types:</p> <ul style="list-style-type: none"> <li>• Events</li> <li>• Process Steps</li> <li>• Gateways</li> <li>• Data Objects</li> </ul> <p>All acronyms used in the OV-6c descriptions must be listed and spelled in the AV-2 Acronyms Definitions List.</p>
<b>OV-2</b>	Pools represent OV-2 Nodes and Lanes represent OV-2 Subnodes
<b>OV-3</b>	IE's in the OV-3 are represented as Data Objects. Each Data Object may be linked to one and only one IE.
<b>OV-5</b>	Process Steps in the OV-6c are derived from and linked to leaf-level Operational Activities in the OV-5 Activity Model. Each of these process level activities must have at least one Process Step mapped to them.
<b>OV-6a</b>	Each Process Step may be linked to one or more OV-6a Business Rules. Action Assertion Business Rules from the OV-6a help to define and are linked to Process Steps and Gateways in the OV-6c
<b>OV-7</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and the OV-7.
<b>SV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and the SV-1.
<b>SV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and the SV-5.
<b>SV-6</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and the SV-6.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and the TV-1.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and the DFMIR/FFMIA.

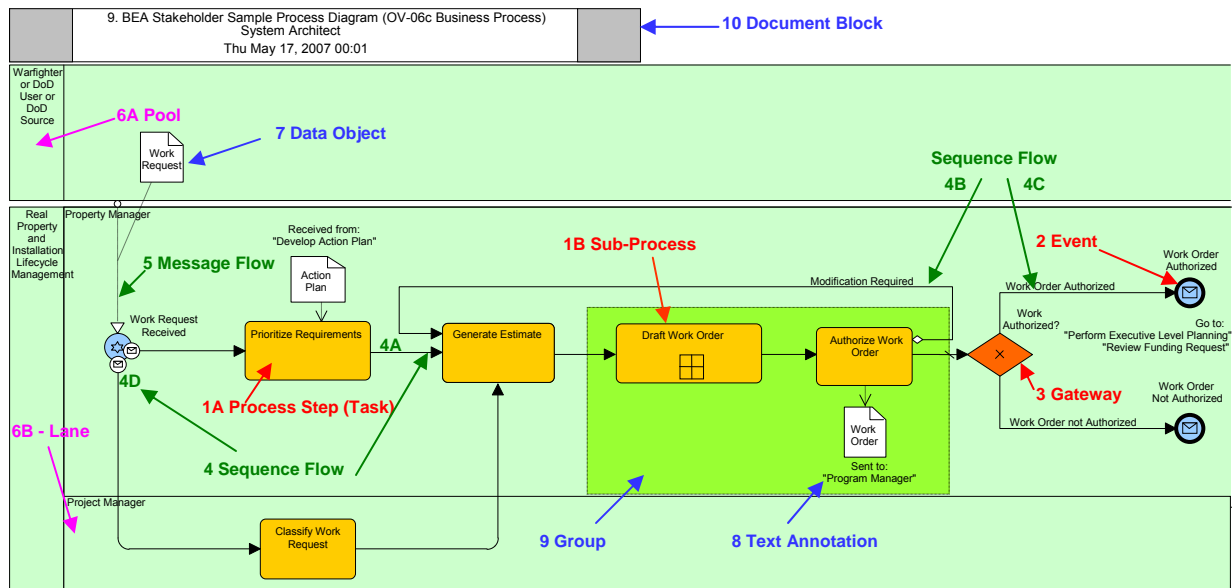
Figure 8-1, Relationships Between OV-6c and Other BEA Products



### 8.1.4 OV-6c Product Definitions

The OV-6c product consists of a set of BEA Business Process Diagrams, which may drill down in detail. The BEA repository contains descriptions, attributes and linkages to objects in other BEA products described in this document. The OV-6c Diagram objects, as shown in Figure 8-2, Objects of an OV-6c Diagram, are characterized into four major groups: Flow Objects, Connection Objects, Participants and Artifacts.

Figure 8-2, Objects of an OV-6c Diagram



*Flow Objects* actually perform the work and produce the products, synchronize the Process Steps, and direct the process flow. Red numbers identify these on Figure 8-2, Objects of an OV-6c Diagram. The Flow Objects are:

- **Process Steps** perform the work and produce the product. Process Steps, are also called *tasks* (1A). Tasks that are further decomposed into subtasks are called *Sub-Processes* (1B). Sub-Processes are identified with a “+” sign at the bottom center of the Process Step symbol. Sub-Process detail is included in a separate Diagram.

The BPMN specification identifies three Process Step attributes that address the association between Process Steps and Data Objects: Input Sets, Output Sets, and IO Rules.<sup>5</sup>

- **An Input Set** is simply a group of BPMN artifacts, in this case Data Objects, which define the data requirements for input to the Process Step.<sup>6</sup> (Note that a Process Step may have more than one Input Set.) When associated with an Input Set a Data Object has an attribute, Required For Start, which, when set to True, denotes that the Data Object is required for the Process Step to start.<sup>7</sup>
- **An Output Set** is simply a group of BPMN artifacts, in this case Data Objects, which define the data requirements for output from the Process Step.<sup>8</sup> (Note that a Process Step may have more than one Output Set.) When associated with an Output Set a Data Object has an attribute, Produce At Completion, which, when set to True, denotes that the Data Object is produced when the Process Step has been completed.<sup>9</sup>
- **IO Rules** specify the required relationship between one Input Set and one Output Set. That is, if the process activity is started with a specified input, that Process Step shall complete with the specified output.

<sup>5</sup> BPMN v1.1, Appendix B.6.1, Common Activity Attributes

<sup>6</sup> BPMN v1.1, Appendix B.11.10, InputSet

<sup>7</sup> BPMN v1.1, Appendix B.11.1, ArtifactInput

<sup>8</sup> BPMN v1.1, Appendix B.11.13, OutputSet

<sup>9</sup> BPMN v1.1, Appendix B.11.2, ArtifactOutput

- **Events** act like traffic signals and hold up the process or allow it to proceed in response to things that happen, called *triggers*. A *Start Event* starts the process in response to a trigger (in this case receipt of one of many allowable messages, shown by the envelope stereotype). An *End Event* (2) signifies the completion of the process. There are three types of Events, based on when they affect the flow, *Start*, *Intermediate* and *End*:
  - **Start Event** – A Start Event indicates where a particular process will start. In terms of Sequence Flow, the Start Event starts the flow of the process, and thus, will not have any incoming Sequence Flow. A Trigger is a mechanism that signals the start of a Business Process. A Start Event shall have a Trigger, indicating how the process starts: Message, Timer, Rule, Link, or Multiple. The Start Event shares the same basic shape of the Intermediate Event and End Event, a circle, but is drawn with a single thin line.
  - **Intermediate Event** - Intermediate Events occur between a Start Event and an End Event. This is an Event that occurs after a process has been started; it will affect the flow of the process but will not start or (directly) terminate the process. The Intermediate Event shares the same basic shape of the Start Event and End Event, a circle, but is drawn with two thin lines.
  - **End Event** - The End Event indicates where a process will end. In terms of Sequence Flow, the End Event is the end of a Task or an output that concludes the process, and thus, will not have any outgoing Sequence Flow. An End Event can have a specific Result that will appear as a marker within the center of the End Event shape. End Event Results are Message, Error, Compensation, Link and Multiple.

If there is more than one starting or ending Event for a process, combine them into a single Multiple (start or end) Event. Link all Initiating Events or Ending Events to the definition of the Multiple Event. Create a graphic comment on the Event that starts with “Initiating Events:” and list each initiating Event in quotes on a new line. If there is more than one Sequence Flow from the Start Event, use “Initiating Events” followed by a list of Initiating Events for that process. Follow this by a blank line and repeat for each process.

- **Gateways** control the divergence and convergence of a flow. Thus, it determines decisions, as well as the forking, and merging paths. The following types of Gateways may be used, depending in the conditions:
  - **Exclusive Gateway** - Exclusive decision Gateways take only one (of many possible) outgoing paths regardless of the input Sequence Flow. Exclusive Merge Gateways take the single output Sequence Flow when any (of many possible) input Sequence Flow occurs. A data-based Gateway makes the decision from data passed as part of the Sequence or Message Flow. An Event-based Gateway makes a decision based on the type of triggering Event.
  - **Event-Based Gateway** - The Business Process may need to make a decision based on an Event, such as the receipt of a message or the passage of time. Use an *Event-Based* Gateway. The Event triggers determine the course of action. The *Event-Based* decision Gateway must be used when the passage of time is not data-dependent.
  - **Inclusive Gateway (or)** - Inclusive decision Gateways take more than one Sequence Flow when more than one decision condition evaluates as True. Think of each condition independently activating its own Sequence Flow. The major difference between Inclusive and Exclusive Gateways is that the Exclusive Gateway only takes one Sequence Flow when more than one condition evaluates as true, while the inclusive Gateway takes all the Sequence Flows.
  - **Complex Gateway** – Indicates a complex or compound set of conditions that determine the Sequence Flow of the Process, commonly used to simplify and replace a set of linked Gateways. Process Architects provide complex expressions that determine the merging/splitting behavior of the Gateway. Back-to-back Gateways should be avoided unless their use clarifies the process flow.

*Connection Objects* are represented by arrows that show the flow via sequence or by synchronizing messages between different organizations. These are identified on Figure 8-2, Objects of an OV-6c Diagram, with green numbers. The two types of Connection Objects are:

- **Sequence Flows**, shown by solid arrows, indicate the direction of the Process, from one Process Step to the next. Displaying the name of a Sequence Flows **(4A)** is optional, except for *Conditional Sequence Flows* **(4B)**, since these represent Gateway decisions **(4C)**, or when it adds clarity to the Diagram. Conditional Sequence Flows are represented by a diamond icon at the origin and the process follows this Sequence Flow when the condition is true. Some Sequence Flows have an *initiating Event* **(4D)** that triggers the Sequence Flow, such as the receipt of a message.
- **Message Flows**, shown by dotted arrows, denote messages between Participants (represented by separate *Pools*) that synchronize their separate internal processes.

Participants and their roles are represented, respectively, by Pools and Lanes within Pools.

- **Pools (6A)** are represented by an open rectangle with a *Participant's* name on the left. The Pool contains the processes performed by a Participant. It also acts as a graphical container for portioning a set of Process Steps from other Pools. A Pool may be further divided into **Lanes (6B)**, if it is necessary to show *Roles* within the Pool.

The diagram may contain *Artifacts*; notations that do not affect the process flow, but provide clarity to the reader. With the exception of the Document Block, Artifacts should be used only when necessary. Artifacts on the OV-6a diagram include:

- **Data Objects**, represented by a folded paper icon, reflect data that is consumed or produced by a Process Step. Data Objects are the mechanism to show what data is consumed or produced by Process Steps.
- **Text Annotations** are comments provided on the diagram for clarification purposes. The OV-6c analyst frequently uses this artifact to show where Messages, Sequence Flows, or Data Objects come from or go to.
- **Groups**, shown as a box enclosing multiple diagram objects, indicate a grouping of diagram objects that does not affect the Sequence Flow. It can be used for documentation or analysis purposes. Groups may also be used to identify the objects related to a distributed transaction that is shown across Pools.
- **Document Block** is a text box located in the upper left corner of the diagram containing the diagram name and the last update date. For more details see Section 8.3.1.
- **Association**, represented by a dotted line with an arrowhead, indicates data, text, and other Artifacts associated with a Flow Object. Associations are used to show the inputs and outputs of Process Steps.

## 8.2 Developing the OV-6c

A top down modeling approach is used; at each level of decomposition, more detailed information is added. The Business Process models depict end-to-end Business Processes representing how a Business Capability is achieved and its interaction with other Business Capabilities. DoD strategic direction for business transformation has evolved, requiring that future Business Processes be aligned with their respective Business Capabilities. SMEs and architects enhance and extend the current models as gaps and or new capabilities are identified.

Model development or extension of a current Business Process model is accomplished in facilitated workshops to address model content and provide preliminary validation of the results. The remainder of this subsection describes in detail the approach to develop the OV-6c. Each subsection represents a step in the approach, and the specific tasks that must be accomplished to complete a given step... Although most of these steps are sequential, some may be started before the previous step is completed. The appropriate standards/guidelines that direct task accomplishment are contained in subsection 8.3.

## 8.2.1 Pre-Development Tasks

### Analyze BEA Improvement Proposal

If there is an existing OV-6c for the Capability related to the BIP ensure that Activities identified in the Node Tree as supporting the BIP are represented as Process Steps in the OV-6c and are sequenced correctly.

### Review fully attributed OV-5 and OV-2

Ensure all Activities are represented as Process Steps in the OV-6c, verify Input and Output ICOMS, verify OV-3 IE's for Data Objects linkages and usages, and verify Nodes in the OV-2 to provide Pool and Lane structure.

## 8.2.2 Development Tasks

The primary source for changes to the OV-6c is the BEA Stakeholder working group. Each team will conduct workshops with appropriate SMEs and business analysts from the BEA Stakeholder community. During the workshops, business analysts capture proposed changes to models and/or object descriptions. The business analysts conduct detailed analysis of approved changes and raise integration issues for resolution.

After revising all available materials and assessing the requirements, the OV-6c architect may develop new/revised OV-6c objects, based on the architectural standards in this document, in cooperation with the BEA Stakeholder analyst. The objects are driven by Stakeholder requirements in accordance with the configuration management procedures. This may involve updating existing symbols/definitions or creating new ones.

### 8.2.2.1 Creating/Modifying the OV-6c Products

Create a new diagram if the diagram is a decomposition of a process or Sub-Process. Modify existing diagrams if the modifications are a result of a workshop review.

#### Business Process Diagrams

- Create or modify an existing diagram. If the new diagram is a decomposition of an existing Process Step, the new diagram shall be created as a child to the existing Sub-Process. The new diagram should inherit the same name as the parent Sub-Process. For each newly created diagram, the BEA Stakeholder representatives should develop a summary of the process model in the diagram “properties” dialog box.
- When creating a new diagram, ensure SME provides proper name and description. If the diagram already exists and content is added or changed, update name and description as required.
- Make sure a Document Block is in the upper left hand corner of the diagram and it contains all pertinent information including a Diagram Title and Diagram Type.

#### Participants

- Create new roles (Lanes) or modify existing ones per BEP guidance:
  - Individual Stakeholder teams may design role-based Lanes within its CBM Pool.
  - Each process has one or more BEP and CBM Stakeholders assigned.

#### Events

- Create/Revise Events (start, intermediate, and end). Each Event shall have clear and concise name and a well-formulated description that identifies and describes the trigger for start and intermediate Events and the result for End Events. Every diagram must have at least one start and one End Event.



## Process Steps

- Create/Revise Process Steps, Sub-Processes, and tasks. All processes shall have a clear and unambiguous description which describes in detail how the following participate within the Process Step:
  - **Inputs:** what is consumed or used as reference.
  - Pertinent **Business Rules**.
  - Value-added action; what is performed, what decisions are to be made.
  - **Outputs:** what is created or altered.
- Place Process Steps from left to right and top to bottom when possible.

## Data Objects

- Data Objects may be associated to Sequence Flows, Message Flows, or as inputs or outputs to Process Steps. SA allows multiple Data Objects to be associated to a Sequence Flow or Message Flow in the Flow Objects definition.

**Note:** The use of Input Sets, Output Sets, and OI Rules to document the association between Data Objects and Process Steps is optional for BEA 6.0.

- Not every Message or Sequence Flow needs to have a Data Object associated with it. Add Data Objects only when it adds clarity to the process.

## Sequence Flows

Sequence flows are BPMN Connecting Objects that relate BPMN Flow Objects (Events, Process Activities, or Gateways) that are in the same Pool.

- Sequence Flows are not required to have names unless the name adds clarity.

**Exception:** All Conditional Flows must be named. In addition, the condition, not the sequence flow name, is to be displayed on a diagram.

- Place Sequence Flow names above the flow line and close to the arrowhead, whenever possible.

**Note:** A sequence flow name uniquely identifies a sequence flow SA artifact. It may be referenced (by a symbol) multiple times either in one diagram or in other diagrams, but its attributes are the same for all instances.

- Conditional Sequence Flows may also be used in lieu of an OR Gateway, to represent alternative paths based upon a condition expression, when the decision logic resides within the process.

## Message Flows

Message Flows are BPMN Connecting Objects that relate exactly BPMN Participants that are not in the same Pool. The Participants involved in a Message Flow are two Pools or optionally two Process Activities that are not in the same Pool or a combination of both – a Pool and a Process Step in a different Pool.

- Message Flows cannot originate from a start Event.
- Message Flows may only be drawn between Pools.
- Place Message Flow names above the flow line and close to the arrowhead, whenever possible.



**Note:** A message flow name uniquely identifies a message flow SA artifact. A message flow may be referenced (by a symbol) multiple times either on the same diagram or different diagrams, but its attributes remain the same for all instances.

## Gateways

- Create Gateways to represent a merge or split of the process flow. Diagram layout should highlight logical structure by using standard patterns to show parallel or alternate paths and iteration.
  - The condition of the Gateway should be expressed in the form of a question, as specific and succinct as possible. The question and answers must set forth the context of the gateway, and the set of answers must be global.
  - Business Rules should be identified, whenever appropriate, to address the logic of the Gateway.
  - The Gateway should be identified as a Data-based Gateway or as an Event-based Gateway.
  - Data-based Gateways use the values of process data to determine which path should be taken.
  - The Event-Based Gateway uses the basic idea that the Decision represents a branching point in the process where the alternatives are based on Events that occur at that point in the process, rather than the evaluation of expressions using process data. A specific Event, usually the receipt of a message or expiration of a timer, determines which of the paths will be taken.
  - Whenever possible, use complex Gateways to avoid using back-to-back Gateways.
- All diagram objects must have a clear and concise description except un-named Sequence Flows, all Message Flows, and all Event-Based Gateways.

### 8.2.3 Post-Development Tasks

These tasks are performed after changes to the OV-6c have been approved by the BEA Stakeholders to ensure integration of the architecture:

- Use Microsoft Word to check the spelling and grammar of all objects in the diagram by exporting all object names, descriptions and graphic comments onto a Word document.
- Verify that all objects are connected via Sequence Flows, Message Flows or associations, as appropriate.
- Remove orphan objects, which do not appear on any diagram or are not connected to or contain any other object.
- Verify that only relevant Pools are included in the diagram.
- Verify that all Process Steps are mapped to an OV-5 Operational Activity.
- Incorporate additional updates to the OV-6c based upon subsequent BEA Stakeholders working group sessions.
- Incorporate peer reviews, quality control reviews, IV&V reviews and architecture verification changes into the BEA.

## 8.3 Modeling the OV-6c Using SA

### 8.3.1 OV-6c Modeling Conventions

This section is a brief overview of the OV-6c and the notation used in System Architect selected to model DoD Business Processes.

BTA selected Business Process Modeling Notation (BPMN) to depict Business Processes in the BEA. BPMN is a standard notation and is utilized across industry and the government to document their Business Processes. The Business Process Management Initiative developed BPMN.

An OV-6c diagram consists of a set of graphical elements. These elements enable the development of diagrams that have a familiar look to most business analysts (for example, a flowchart diagram). *The diagram elements are chosen to be clearly distinguishable from each other and to utilize shapes that are familiar to most process architects.* For example, Process Steps are represented by rectangles and decisions by diamonds. It should be emphasized that one of the drivers for choosing BPMN is that it facilitates development of simple Business Process models, while handling the complexity inherent to real Business Processes.

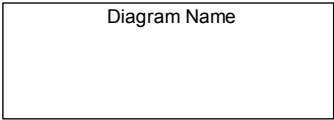
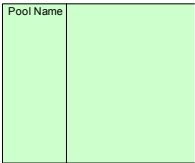
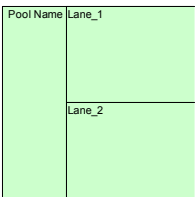
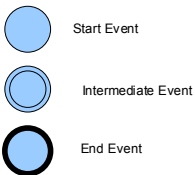
BPMN provides a graphical notation for expressing Business Processes in a Business Process Diagram (BPD), as reflected in DoDAF. The objective is to support process management for both technical and business users by providing a notation that is familiar and understandable to business users, yet able to represent complex process semantics.

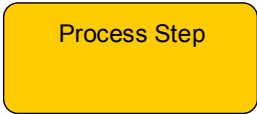
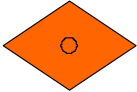
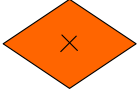
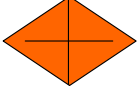
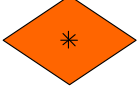

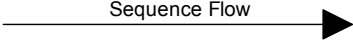
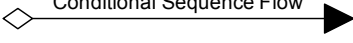
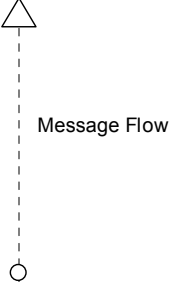
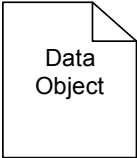
The OV-6c provides the capability of understanding internal business procedures in a graphical notation and gives organizations the ability to communicate these procedures in a standard format.

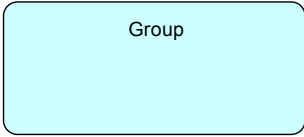
The OV-6c should not represent Data Flow modeling. However, the OV-6c may depict the flow of data (messages) and the association of Data Objects to Activities in a manner consistent with the OV-5 and OV-3.

While the general flow of objects within diagrams will be from left to right and top to bottom, due to programmatic and space constraints, objects may be connected to other objects in a manner that is logical and readable, taking into account the constraints listed above.

**Table 8-1, Modeling Guidelines for OV-6c**

Element	Symbol	Format
Document Block		Position: Upper Left Corner Border: Solid Black Fill: None Text: Color: Black Font: Arial Size: Default
Pool		Border: Solid Black Fill: Light Green Text: Color: Black Font: Arial Size: Default
Lane		Border: Solid Black Fill: Light Green Text: Color: Black Font: Arial Size: Default
Event		Border: Solid Black Fill: Light Blue Text: Color: Black Font: Arial Size: Default

Element	Symbol	Format
Process Step		Border: Solid Black Fill: Gold Text: Color: Black Font: Arial Size: Variable
Gateway	 Inclusive (OR) Gateway  Exclusive (XOR) Gateway  And Gateway  Complex Gateway  Event Based Gateway	Border: Solid Black Fill: Red Text: Color: Black Font: Arial Size: Default
Sequence Flow	 Sequence Flow  Conditional Sequence Flow	Line: Solid Black Text: Color: Black Font: Arial Size: Default
Message Flow	 Message Flow	Line: Dashed Black Text: Color: Black Font: Arial Size: Default
Data Object		Border: Solid Black Fill: White Text: Color: Black Font: Arial Size: 10

Element	Symbol	Format
Group		Border: Solid Black Fill: Contrasting light pastel Text: Color: Black Font: Arial Size: Default

## 8.3.2 Modeling OV-6c Objects

### 8.3.2.1 Diagram Conventions

All Diagrams must be clearly named and defined:

- Diagram Names shall contain at least one (1) verb and one (1) noun, unless the diagram is the Enterprise Process Model or one of the BEP threads.
- Avoid using generic terms such as “Manage”, “Perform”, “Execute”; instead use:
  - For “Manage”, use “Handle”, “Collaborate”, “Sustain”, “Maintain”, “Monitor”, etc.
  - For “Perform”, use “Implement”, “Develop”, “Produce”, “Distribute”, “Publish”, etc.
  - For “Execute”, use “Initiate”, “Finalize”, etc.
- The Diagram Name shall start with the BEA Stakeholder abbreviation followed by a dash. If the process is shared among BEPs, all relevant BEPs shall be listed, separated by dashes.
- Diagrams that depict a Sub-Process should be named for the Sub-Process. However, it is recognized that in the case of Reusable Sub-Processes this is not always possible.
- Each OV-6c Diagram shall include a description to provide a clear understandable narrative of what the Diagram portrays. This information should be included in the Diagram Properties.
- The Diagram description must be clear, concise and unambiguous. The description shall include, as a minimum, a summary of the main Process Thread, a reference to the Events and their relationship to other diagrams, a reference to the Gateways and the decisions made, and a summary of the major Business Rules that impact the diagram.

Participants, Data Objects, and Process Steps must have labels containing name and/or other attributes placed inside the shape. Events, Gateways Sequence Flows and Message Flows labels should be placed above the shape as much as possible. However, labels may be placed below or to the right or left of the object to enhance readability of the Diagram.

While extensible, OV-6c diagrams still have the basic look and feel for any viewer to easily understand a diagram created by any process architect. Thus, the footprint of the basic flow elements (Events, Process Steps and Gateways) should not be altered.

### 8.3.2.2 Object Naming Conventions

Objects in the OV-6c diagrams shall have a concise and intuitive name according to the following standards:

- All OV-6c object names shall be title-case. Nouns must be singular, unless the plural form is required to correctly describe the object. Use only approved acronyms.
  - Process Steps must be clearly named and defined. The Process Step name shall contain at least one verb in the present tense and one (1) noun. For example, “Analyze Record.”
  - Events shall be clearly defined and labeled. Event names shall consist of at least one noun and one verb or adjective, for example, “Record Analyzed”, “Booking Successful.” Event names shall

be as specific as possible, avoiding generic names such as “End”, “Stop”, or “Start.” Do NOT use verb-noun names for Events; for example, “Send Notification” is not a proper name for an Event.

- Data Objects shall be clearly named and defined. The name must have at least one noun that accurately describes the Data Object. A Transition State may be used as necessary to identify changes in Data Objects content or State.
- Decision Gateways must be clearly named and defined with a combination of nouns and verbs conveying a question or query, ending in a question mark. The question and answers must include the context, as the answer must be global in nature.

**Example:** The question “Adjustment required?” with the answers “Adjustment not required” and “Adjustment required” are not acceptable because they may also refer to other unrelated adjustments elsewhere in the architecture. A more specific question incorporating context would be “Adjustment to cost model required?” with the answers being “Adjustment to cost model required” and “Adjustment to cost model not required” would be better.

- Gateway Control Types should be displayed consistently.
  - Participants (Pools) and Roles (Lanes) names shall be composed of nouns, and adjectives, where appropriate, and must be clearly defined.
  - Groups may be used to cluster related objects. A name shall be assigned to the Group, defined using appropriate nouns and verbs.
- The following special characters shall not be used in object names:
    - “\*”
    - “(” or “)”
    - “\_”
    - “/”
    - “&”
    - “?” (except in Gateways)
  - Use initial uppercase for all object names. Incidental words, such as prepositions within the object name (“with”, “at”, “in”, “and”, “no”, “not”, “a”, “an”, “to”, or “the”), shall be all lowercase.
  - Object names shall be spelled correctly and shall not use future tense.
  - Refer to the AV-2 for the approved list of acronyms and abbreviations.

### 8.3.3 OV-6c Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 8.3.3.1 OV-6c Lessons Learned

- When decomposing a Process Step into a Sub-Process, ensure that all of the objects in the decomposition diagram support the purpose of the diagram.
- Account for multiple Data Objects associated with a Sequence Flow or Message Flow as they show up incorrectly as orphans on the current BART reports.
- Account for initiating Events that only show up on Message Flows or Sequence Flows; they show up incorrectly as orphans on the current BART reports.

- Delete a Pool on a diagram when all objects are removed from it and no Message Flows touch it.
- Remove the object from the encyclopedia after the symbol has been removed from the diagram, after first determining that the object has not been referenced in any other diagram.
- Verify that comparison reports are run using the most up to date correct baseline BEA modeling tool encyclopedia.
- Use Microsoft Word to check description spelling and grammar.
- Track version dates of the baseline and approved models.
- Ensure correct Gateway stereotypes are used.
- Ensure correct Event stereotypes are used.
- Standard color coding of diagrams during the workshop is useful for participants to identify where content was added, changed or deleted. Standard color coding should be in line with that used in the BEA Compare reports.
- Ensure that all exception reports have been reviewed and resolved.

#### **8.3.3.2 OV-6c Common Pitfalls**

- Events are duplicated on parent and child diagrams
- Sequence Flow and Message Flow lines cross each other unnecessarily
- Object labels are hidden
- All condition expressions out of a Gateway are not identified
- Child diagrams are not associated with their parent Process Step
- Object descriptions are not comprehensive.
- Object naming conventions are not followed.
- Process Steps are not associated with Operational Activities.



The main features of this diagram include:

- **Doc (title) block (1)** is a text box located in the upper left corner of the diagram containing the diagram name, and last modification date.  
**Example:** ‘OV-2 Financial Management (OV-2 Op Node Connectivity) Mon Feb 06, 2006 15:07’
- **Operational Nodes (2)** are represented by the oval shapes in the diagram. In each OV-2 Diagram, the primary CBM Operational Node is centered on the diagram to identify it as the focus. Figure 9-1 shows the Financial Management (FM) CBM Operational Node exchanging information with the other CBMs (WSLM, HRM, RPLIM, MSSM, and Enterprise) as well as the External Operational Node. On each OV-2 diagram, only the primary node displays the list of related Operational Activities in the central Operational Node. As shown, the FM Operational Node displays the list of needed Operational Activities from the OV-5 model to associate with DoD Financial Management needs.
- **Need Lines (3, 4)** in Figure 9-1 symbolize the grouping of information to be exchanged between Operational Nodes. For example, the FM Operational Node for this diagram is exchanging information with itself through Need Line *FM-FM* (3) or with other Operational Nodes such as External through Need Lines *FM-External* or *External-FM* (4). Need Lines are labeled by an abbreviation that indicates the sending Operational Node to the Receiving Operational Node.
- **Information Exchanges (5)** are assigned to a Need Line, from ICOMs in the OV-5 models, and used to depict information being exchanged between OV-5 Activities assigned to Operational Nodes. An IE can be assigned to more than one Need Line, need Lines can have multiple IEs assigned to them and there is a many-to-many relationship between Need Lines and IEs.

**Note:** IEs are not shown graphically on the OV-2 diagram to avoid cluttering the model with too much information.

### 9.1.3 Relationship to Other BEA Products

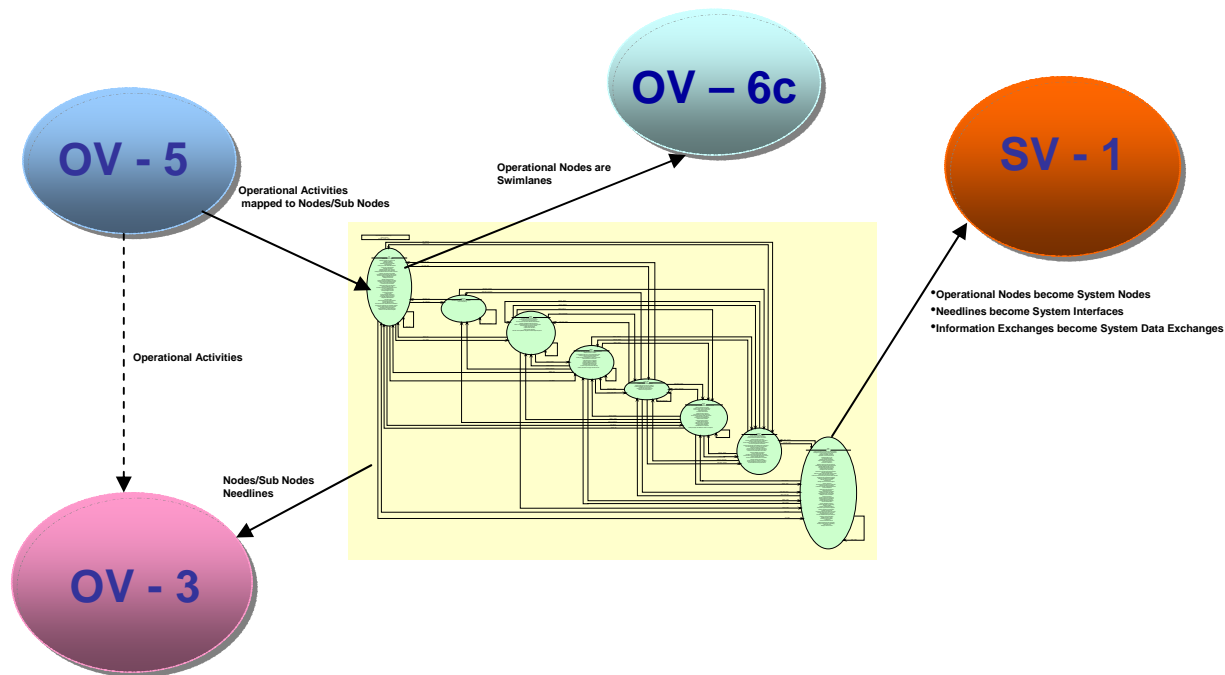
As illustrated in Figure 9-2, the OV-2 is related to other BEA products as follows:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the OV-2 is affected in the release.
<b>AV-2</b>	<p>All OV-2 terms with specific meaning must be included in the AV-2 Term Definitions list. These terms must include, as a minimum, the following object types:</p> <ul style="list-style-type: none"> <li>• Need Line Definitions</li> <li>• Operational Node Definitions</li> </ul> <p>All acronyms used in OV-2 descriptions must be listed and spelled out in the AV-2 Acronym Definitions report.</p>
<b>OV-3</b>	A Need Line in an OV-2 includes one or more IEs from the Operational IE Matrix (OV-3). The OV-3 provides the detailed attributes that define each IE.
<b>OV-5</b>	Operational Nodes in the OV-2 represent logical groupings of Operational Activities from the Operational Activity Model (OV-5). Once the OV-5 is stabilized, the Activities are assigned to the Operational Nodes in the OV-2, and related Inputs and Outputs from the OV-5 are then translated to IEs that depict the required information flow represented on the OV-2 as Need Lines between Operational Nodes.
<b>OV-6a</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and the OV-6a.
<b>OV-7</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and the OV-7.



<b>SV-1</b>	A System Node in a Systems Interface Description (SV-1) is linked to an Operational Node in the OV-2, indicating that the systems contained in that System Node are required to support the activities performed at the Operational Node.
<b>SV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and the SV-5.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and the TV-1.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and the DFMIR/FFMIA Guidance Model.

Figure 9-2, Relationships Between OV-2 and Other BEA Products



### 9.1.4 OV-2 Product Definitions

The following are definitions of the key elements contained in the OV-2 Operational Node:

- **Operational Node:** An Operational Node is an element of the Operational Architecture that represents a logical grouping of Operational Activities.
- **Need Line:** A Need Line documents the requirement to exchange information between Operational Nodes. The Need Lines are directional but do not indicate how the information transfer is to be implemented or sequenced. Need Lines are mapped to IEs, corresponding to Inputs and Outputs in the OV-5 Operational Activity diagram.
- **Operational Activity:** An action performed in conducting the business of an enterprise. This is a general term that does not imply a placement in a hierarchy or a timing sequence. For example, it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the Operational Activity Model.

- **Information Exchange:** A communication between two Operational Nodes. A corresponding leaf-level Activity Input and Output ICOM is associated to the IE with the same name, definition, and Stakeholders (CBM and BEP).

## 9.2 Developing the OV-2 Models

This section describes the approach to develop, extend and maintain the OV-2. The OV-2 is developed in SA as a diagram.

### 9.2.1 Pre-Development Tasks

The tasks that must be completed prior to OV-2 development and/or maintenance are:

- Identify, for each OV-2 CBM Focus Area diagram, the SMEs required for content contribution, validation and communication of Operational Nodes, Need Lines, IEs and hierarchy to primary stakeholders.
- Define specification/format for all object descriptions (Internal Operational Nodes, External Operational Nodes, Need Lines and IEs).
- Using approved sources and SME support, select Operational Nodes covering the full scope of the DoD BMA. Currently, the internal Operational Nodes will be limited to the Core Business Missions. For each focus diagram, a single External Operational Node will represent all external node interactions.
- Validate leaf-level Operational Activities to each Operational Node. Determine and map appropriate logical Operational Activities to each identified Internal and External Operational Node, based on Stakeholder requirements.
- Convert leaf-level ICOMs to IEs. From all Inputs, Controls, Outputs and Mechanisms associated with the leaf-level Operational Activities assigned to each Operational Node, identify the Inputs and Outputs (except for those Outputs that become Controls) and convert these to IEs. IEs are defined using the same name and definitions as their corresponding Input or Output ICOMs.
- Validate the external Operational Activity to be assigned to the correct leaf-level ICOM.
- Validate the parent ICOM to the child ICOM.
- Define and analyze Need Lines and IEs. Review and analyze from-to Operational Activity relationships for each IE. This is a starting point for determining the direction and exchange of information between Operational Nodes. Assign the Need Lines as groupings of IEs that share the same Source and Destination Operational Nodes on an OV-2 diagram, based on source and destination activity assignments and associated ICOMs on associated OV-5 diagrams. For each Need Line, enter the associated IEs.
- Validate OV-5 Linkages. Insure all of the diagrams are linked all the way up to the OV-5 Context level (A-0).

### 9.2.2 Development Tasks

When a well-defined OV-5 architecture product is completed and stabilized, the list of Operational Nodes is identified, and all the leaf-level Operational Activities are assigned to an Operational Node, the OV-2 Operational Node Connectivity diagram is automatically generated using the OV-2/3 auto generation tool for SA.

#### 9.2.2.1 Creating/Modifying the OV-2

The following are the procedural steps to generate the OV-2 Diagram:

- Run the OV-2/3 generation tool
- Click on the OV-2 icon, then the “OV-2 Wizard – [Step 1]” screen will be displayed

- Retrieve the development Encyclopedia UDL for the “UDL File” tab
- Click the “Next>” command, then the “OV-2 Wizard – [Step 2]” screen will be displayed
- To delete the existing OV-2 Diagrams and Need Lines, then a new set of OV-2 Diagrams and Need Lines will be generated; select (or check) all five optional items as follows:
  - Generate ‘All’ Diagram
  - Generate Parent Diagrams
  - Generate Children Diagram
  - Generate Recursive Need Lines (Need Lines that connect an Operational Node to itself)
  - Delete OV-2 Diagrams and Need Line Definitions Before Starting (Clean Run)
- Click the “Next>” command, then the “OV-02 Results” screen will be displayed
- Click the “Start” Command
- Manually adjust the Need Lines in the OV-2 Diagrams
- Add the description for each OV-2 Diagram
- Add the description for each Need Line
- To update the OV-2 Diagrams and Need Lines, select (or check) four optional items as follows:
  - Generate ‘All’ Diagram
  - Generate Parent Diagrams
  - Generate Children Diagram
  - Generate Recursive Need Lines (Need Lines that connect an Operational Node to itself)
- Click the “Next>” command, then the “OV-2 Results” screen will be displayed
- Click the “Start” command

#### **9.2.2.2 Diagram Model Coordination with Stakeholders**

- Perform impact analysis where a change in other BEA products may affect the OV-2. If a change is made to OV-2 products notify the owner of the related products.
- Map all OV-2 Nodes to OV-5 leaf-level Operational Activities
- Verify each linkage with the appropriate SA report: OV-2 to Other Products.

#### **9.2.2.3 Diagram/Model Cleanup**

The process for completing the OV-2 products is described below. Some of these tasks can be performed concurrently and several of them actually can begin only when the other products are completed. The main tasks for this process are:

- Review, refine and modify Operational Node diagram objects. Perform an internal peer review to validate the OV-2 Operational Node Connectivity Model against the most current APG Modeling Guidelines. Adjudicate and incorporate peer review recommendations and obtain approval for the OV-2 and OV-3 products.

### **9.2.3 Post-Development Tasks**

These tasks are performed after changes to the OV-2 by the Stakeholders to ensure integration of the architecture:

- Conduct a product review to ensure that the OV-2 products adhere to the APG modeling guidelines, have clean BART reports and comply with the OV-2 Product Checklists (See Appendix B-3: ).
- Incorporate quality control and Architecture Verification changes into the BEA OV-2 product.
- Incorporate recommendations from the peer review and obtain final approval for the OV-2 diagrams.


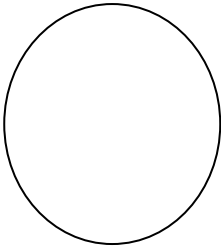

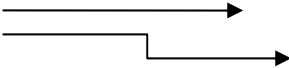
## 9.3 Modeling OV-2 Products Using SA

### 9.3.1 Modeling Conventions

The following modeling conventions shall be used to create the OV-2:

#### 9.3.1.1 Use of Color, Size and Lines in a Diagram

**Table 9-1, Modeling Guidelines for the OV-2 Diagrams**

Element	Symbol	Format
Doc Block	Text Box: 	<i>Position: Upper left corner of the Diagram</i> <i>Border: Solid Black</i> <i>Fill: None</i> <i>Text:</i> <i>Color: Black</i> <i>Font: Arial</i>
Operational Nodes	Oval textbox: 	<i>Border: Solid Black</i> <i>Fill:</i> <i>Color: Light Green</i>  <i>Text:</i> <i>Color: Black</i> <i>Font: Arial</i> <i>Size: 14 pt.</i> <i>Label: Operational Node name</i>
Need Lines	<i>Straight Arrow Connectors</i> 	<i>Color: Black</i> <i>Labels:</i> <i>Font: Arial</i> <i>Color: Black</i> <i>Size: 14 pt.</i>

#### 9.3.1.2 Diagram Conventions

- There shall be at least one OV-2 diagram for each CBM, plus an integrated Enterprise-level OV-2 representing the sum of the CBM OV-2s.
- A single Need Line will be used to represent the interactions of all IEs that have a common source and destination pair of Operational Nodes.
- The OV-2 diagram should not have a border.
- Each OV-2 Diagram shall include a text description to provide a clear understandable narrative of what the Diagram portrays.

- All modeling objects should be clearly labeled and the dimensions of the label will be adjusted, if needed, to avoid truncated text.
- The Doc Block is placed in the upper left-hand corner of every diagram, with no white space above or to the left of the Doc Block.
  - The dimensions of the Doc Block should be adjusted so that the entire heading is displayed on a single line. No truncation indicators should appear on the Doc Block.
  - The Doc Block should not have a graphical comment. To confirm this in SA, right-click on Doc Block and choose Display Mode. Uncheck Graphical Comment.

### 9.3.1.3 Object Naming Conventions

- Valid Operational Node names are the acronyms for the five CBMs, plus two additional Nodes: “Enterprise and “External.”
- Sub-Operational Nodes names shall start with the acronym for the parent CBM, followed by the name.
- Need Line names shall consist of the sending Operational Node name or its approved abbreviation, a dash and the receiving Operational Node name or its approved abbreviation.
- IEs shall be named the same as the leaf-level ICOM. They should represent every OV-5 Input and Output linked to a leaf-level Operational Activity as an IE.

## 9.3.2 Modeling OV-2 Objects

### 9.3.2.1 Operational Nodes:

- The dimensions of the Operational Nodes may be adjusted to ensure the enclosed text is visible and avoid truncation indicators (dots).
- All Operational Nodes that must interact with a given CBM will be depicted in the corresponding OV-2 Diagram.
- The appropriate Operational Activities which are performed at that Node will be assigned to it, based on the OV-5 models.
- Operational Node labels contain the Operational Node name. Below the node name is the word “Activities,” accompanied by a solid black horizontal line, and below the “Activities” label is a list of the associated Operational Activity names, in quotes. (Only display the associated Operational Activities for the central Operational Node on each diagram.)
- Each Operational Node must be associated with at least one Operational Activity.
- Each leaf-level Operational Activity is assigned to at least one Operational Node.
- Each Operational Node must be referenced by at least one Need Line.
- Using SA, fill in the “Stakeholders” tab on the definitions of each internal Operational Node with the appropriate name(s) of BEP and CBM elements that have an interest in that Node. Internal Operational Nodes are related only to the CBM for which they are named.
- Each Operational Node must be associated with a Type, either “Abstract” or “Physical.”

### 9.3.2.2 Need Lines

- Arrows indicating the direction of information flow represent Need Lines.
- Need Lines shall be a grouping of OV-3 IEs, sharing common source and destination Operational Nodes. In SA, use the “Info. Exchanges” tab on the definition of the Need Line to link the appropriate IEs to the Need Line. Every Need Line must have at least one IE assigned.
- Every effort should be made to ensure that Need Line arrows do not intersect.

- Need Lines shall use the default SA pen width and be black in color.
- Do not display the associated IEs under the Need Lines on the OV-2 Diagram.
- A Need Line Name can exist on only two OV-2 diagrams unless it is linked to an External Operational Node or if a sub-node exists.

### 9.3.3 OV-2 Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 9.3.3.1 OV-2 Lessons Learned

The following lessons learned have been and serve as the basis for the OV-2 on Appendix B:

- OV-5 Models must be stabilized before OV-2 modeling can begin.
- All Operational Activities in the OV-5 model must be tagged to CBM(s) and/or BEP(s).
- All leaf-level Operational Activities must be assigned to at least one Operational Node.
- All External Activities in the OV-5 models must be specified and tagged.
- All leaf-level Input and Output ICOMs must be defined and their sources or destinations must be explicitly specified.
- If the leaf-level ICOM is associated with an external activity, the external activity must be explicitly specified.
- If the ICOM is associated with a parent ICOM, the parent ICOM must be explicitly specified.
- Providing draft OV-2 and OV-3 products during OV-5 and OV-6c development will assist workshop participants to identify the impact of changes made in those products.
- All exception reports must be reviewed and resolved.

#### 9.3.3.2 OV-2 Common Pitfalls

The following are common mistakes in the use of SA that could affect the development lessons learned have been and also serve as the basis for the OV-2 Checklist on Appendix B:

- Intersecting Need Lines.
- Ineffective use of diagram space:
  - Nodes too large or too small
  - Need Line connections unclear
  - Diagram overly dense or too spread out
- Inappropriate color coding of diagram objects
- Not displaying Operational Activities associated with focused CBM Node
- Inappropriately displaying IEs associated with Need Lines
- Truncated text on Need Lines
- Acronyms not spelled out in definitions

# 10 OV-3 – Operational Information Exchange Matrix

## 10.1 Summary Description

This section describes the OV-3 Operational Information Exchange Matrix' its relationship to other BEA products, the development method, and the modeling guidelines to be followed.

### 10.1.1 Product Purpose

The OV-3 Operational Information Exchange Matrix is a tabular depiction of the information to be exchanged by identifying who will exchange the information, what information is to be exchanged, and with whom it will be exchanged in the BEA. It shows how Information Exchanges must occur and expresses why the information is necessary to be exchanged. The OV-3 matrix is developed to represent the BEP Operational Activities. All OV-3 information is associated to an IE.

### 10.1.2 Product Structure

The OV-3 product is depicted in a matrix. It comprises Need Line, IE, BEP(s), Source Node, Source Activity(ies), Destination Node, Destination Activity(ies), OV-7 Data Entity(ies), OV-7 Data Attributes and IE Description. The matrix contains several tabs that include the Information Exchange Matrix for each Operational Node (as shown in Table 10-1, Example of an Operational Information Exchange Matrix), the we have the IE Tab that contains the information related to each Information Exchange (as shown in Table 10-2, Example of Information Exchange Tab) such as Description, OV-7 Data and if the IE is Available for Compliance.

**Table 10-1, Example of an Operational Information Exchange Matrix**

	(1)	(2)	(3)	(4)	(5)	(6)
	A	B	C	D	E	F
1	Need Line	Information Exchange	Source Node	Source Activity(ies)	Destination Node	Destination Activity(ies)
2	Enterprise - Enterprise	Information Assurance Technology Self Assessment	Enterprise	Provide Information Assurance Services	Enterprise	Perform Reporting
3	Enterprise - External	Certified Financial Statement Information	Enterprise	Perform Reporting	External	Process Treasury Information
4	Enterprise - External	Information Assurance Technology Self Assessment Report	Enterprise	Perform Reporting	External	Process Office of Management and Budget Information
5	Enterprise - External	Management Report of Cash Accounting	Enterprise	Perform Reporting	External	Process Treasury Information
6	Enterprise - External	Performance and Accountability Report	Enterprise	Perform Reporting	External	Process Office of Management and Budget Information
7	Enterprise - FM	Performance and Accountability Report	Enterprise	Perform Reporting	FM	Evaluate Program Information
8	External - FM	Accounts Payable Adjustments	External	Process Vendor or Customer Information	FM	Manage Liabilities
9	External - FM	Accounts Receivable Request	External	Process Vendor or Customer Information	FM	Establish Accounts Receivable Record Loans and Grants
10	External - FM	Additional Reconciliation Information	External	Process Vendor or Customer Information	FM	Manage Execution with Treasury
11	External - FM	Appropriation Act	External	Process Congressional Information	FM	Execute Apportionment Execute Rescission Deferrals and Cancellations Manage Baseline for Reprogramming
12	External - FM	Approved Apportionment	External	Process Office of Management and Budget Information	FM	Execute Apportionment
13	External - FM	Audit Comments	External	Process Government Accountability Office Information	FM	Manage Financial Reporting Requirement
14	External - FM	Compilation of Budgetary Resources	External	Process Office of Management and Budget Information	FM	Execute Rescission Deferrals and Cancellations

Table 10-2, Example of Information Exchange Tab

(1)	(2)	(3)	(4)	(5)	(6)
A	B	C	D	E	F
Information Exchange	Available for BEA Compliance	BEP(s)	OV-7 Data Entities	OV-7 Data Attributes	Information Exchange Description
1 Acceptance Evidence	X	AV CSE FV MV PV RPA	ELECTRONIC-ADDRESS MATERIEL-CATALOG-ITEM-COMPONENT PERSON-NAME-USAGE	Acceptance_Date [ACCEPTANCE] Acceptance_Point_Code [ACCEPTANCE] Acceptance_Quantity [ACCEPTANCE] Accounting_Classification_Structure_Assigned_Number [DEMAND-LINE-ITEM] Acquisition_Element_Price_Component_Amount [ACQUISITION-ELEMENT-PRICE-COMPONENT] Acquisition_Element_Type_Identifier [MATERIEL-ELEMENT-TYPE] Acquisition_Element_Type_Name [ACQUISITION-ELEMENT-TYPE] Activity_Identifier [ACTIVITY] Address_APO_FPO_Number [ADDRESS] Address_Post_Office_Box_Number [ADDRESS] Address_Street_Direction_Code [ADDRESS] Address_Street_Name [ADDRESS] Address_Street_Number [ADDRESS] Address_Street_Type_Code [ADDRESS] Advance_Flag_Code [TREASURY-APPROPRIATION-FUND-SYMBOL] Agency_Accounting_Identifier_Code [ACCOUNTING-AGENCY] Agency_Accounting_Identifier_Code [ACCOUNTING-CLASSIFICATION-STRUCTURE] Apportionment_Category_Code [APPORTIONMENT-CATEGORY] Asset_Type_Code [SFIS-ASSET-TYPE] Asset_Unique_Identifier [ASSET] Authority_Type_Code [AUTHORITY-TYPE] Availability_Time_Indicator [FUNDING-AUTHORIZATION-ALLOCATION-ALLOTMENT] Availability_Type_Code [TAFS-ACCOUNTING-CLASSIFICATION-STRUCTURE] BEA_Category_Indicator_Code [BEA-CATEGORY]	Documentation of the act of assuming ownership of legal title and accountability of goods tendered and services rendered, excluding Real Property Placed in Service Notification. This serves as proof that the deliverables received or services rendered have been provided fulfilling specified terms and conditions against the previously agreed upon obligating document, contract, and/or intragovernmental order between the supplier and the buyer.
2 Acceptance Information		CSE		Activity_Identifier [ACTIVITY] Advance_Flag_Code [TREASURY-APPROPRIATION-FUND-SYMBOL] Agency_Accounting_Identifier_Code [ACCOUNTING-AGENCY] Apportionment_Category_Code [APPORTIONMENT-CATEGORY] Asset_Type_Code [SFIS-ASSET-TYPE] Asset_Unique_Identifier [ASSET] Authority_Type_Code [AUTHORITY-TYPE] Availability_Time_Indicator [FUNDING-AUTHORIZATION-ALLOCATION-ALLOTMENT] Availability_Type_Code [TAFS-ACCOUNTING-CLASSIFICATION-STRUCTURE] BEA_Category_Indicator_Code [BEA-CATEGORY] Borrowing_Source_Code [BORROWING-AUTHORITY] Budget_Activity_Identifier [BUDGET-ACTIVITY] Budget_Function_Code [BUDGET-FUNCTION] Budget_Function_Sub_Function_Code [BUDGET-FUNCTION-SUB-FUNCTION] Budget_Line_Item_Identifier [BUDGET-LINE-ITEM] Budget_Sub_Activity_Identifier [BUDGET-SUB-ACTIVITY]	Documentation that constructive acceptance has occurred or that ownership of legal title and accountability of goods and services has been transferred to the government buyer that allows the government supplier to record a receivable transaction.

### 10.1.3 Relationship to Other BEA Products

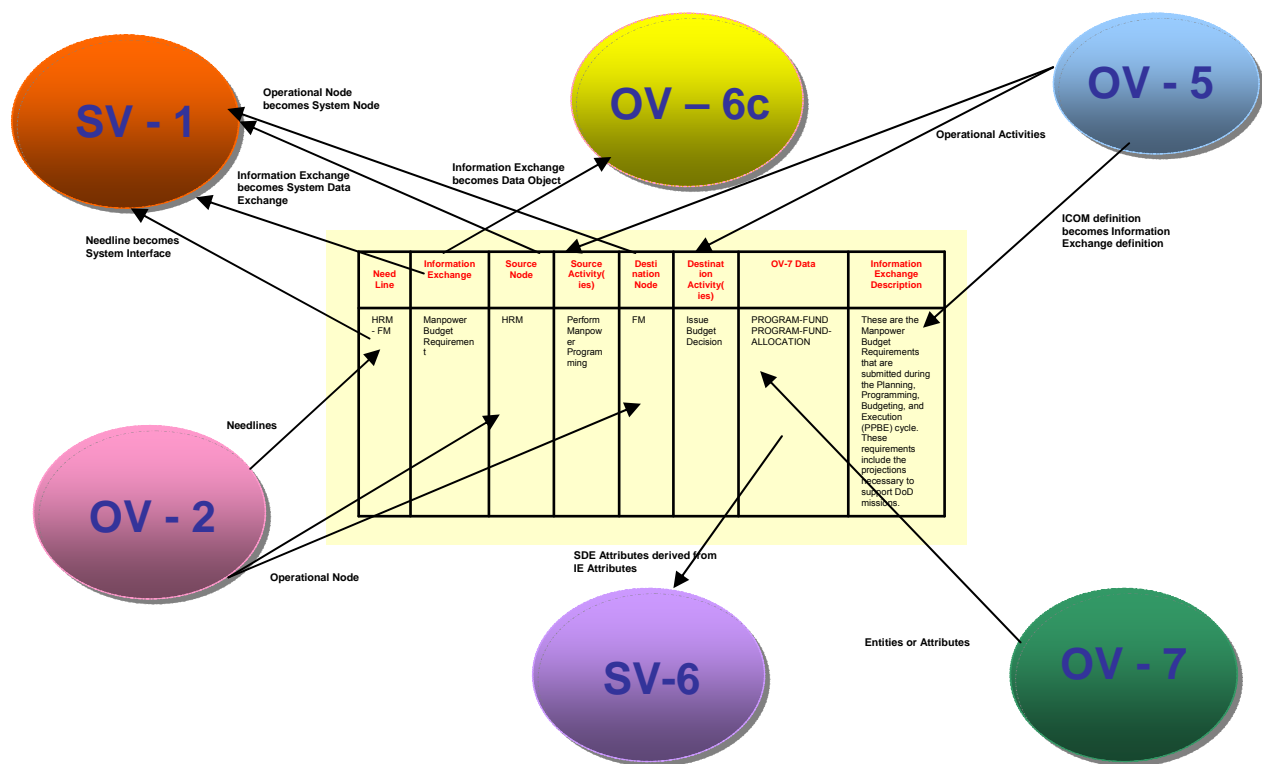
As illustrated in Figure 10-1, the OV-3 is related to other BEA products as follows:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the OV-3 is affected in the release.
<b>AV-2</b>	<p>All OV-3 terms with specific meaning must be included in the AV-2 Terms Definitions list. These terms must include, as a minimum, the following object types:</p> <ul style="list-style-type: none"> <li>IE Definitions</li> </ul> <p>All Acronyms and Terms used in OV-3 descriptions must be listed and spelled out in the AV-2 Acronyms Definitions report.</p>
<b>OV-2</b>	A Need Line in an OV-2 Diagram represents one or more IEs from the OV-3. The OV-3 provides the detailed attributes (for example, Source Node Identifier or Destination Activity) that define each IE. A Need Line must appear on at least one OV-2 diagram.
<b>OV-5</b>	Each Input and Output on the OV-5 connecting Operational Activities in different Operation Nodes is represented as one or more occurrences of an IE in the OV-3.
<b>OV-6a</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-3 and the OV-6a.
<b>OV-6c</b>	An IE represents a unique OV-6c Data Object. The OV-3 provides the detailed attributes (Entities / Attributes, Source Activity, and Destination Activity) that define the Data Object and its usage in



	the Business Process.
<b>OV-7</b>	One or more Entities and/or Attributes in the Logical Data Model (OV-7) are linked to IEs in the OV-3, describing the IEs in terms of the Entities and/or Attributes that comprise it.
<b>SV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-3 and the SV-1.
<b>SV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-3 and the SV-5.
<b>SV-6</b>	One or more SDEs from the Systems IE Matrix (SV-6) are linked to each IE in the OV-3, showing which SDEs are required to support the IE. SDE attributes shown in the SV-6 are derived from similar attributes for related IEs in the OV-3.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-3 and the TV-1.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-3 and the DFMIR/FFMIA Guidance Model.

**Figure 10-1, Relationships Between OV-3 and Other BEA Products**



### 10.1.4 OV-3 Product Definitions

The following are definitions for these objects listed in each column of Table 10-1:

- **Need Line (1):** A Need Line documents the requirement to exchange information between Operational Nodes. The Need Lines are directional but do not indicate how the information transfer is to be implemented or sequenced
- **Information Exchange (2):** The information exchanged between two distinct Operational Nodes.
- **Source Node (3):** Records the Operational Node that creates or otherwise provides information to the list of associated IEs.
- **Source Activity(ies) (4):** Records the Operational Activities associated with an Operational Node that create or otherwise provide information to the list of associated IEs.
- **Destination Node (5):** Records the Operational Node that requires, receives or utilizes information from the list of associated IEs.
- **Destination Activity(ies) (6):** Records the Operational Activities associated to Operational Nodes that require, receive, or utilize information from the list of associated IEs.

The following are definitions for the objects corresponding to each column of the Information Exchange Tab shown on Table 10-2:

- **Information Exchange (1):** The information exchanged between two distinct Operational Nodes.
- **Available for BEA Compliance (2):** Identifies if the Information Exchange is Available for Compliance.
- **BEP(s) (3):** The BEP Stakeholder associated with the Information Exchange based on the ICOM.
- **OV-7 Data Entities (4):** One or more Data Entities from OV-7 Logical Data Model that provide data to support an IE.
- **OV-7 Data Attributes (5):** One or more Data Attributes from OV-7 Logical Data Model that provide data to support an IE.
- **Information Exchange Description (6):** A text description for the IE.

## 10.2 Developing the OV-3

This section describes the approach to develop, extend and maintain the OV-3. The OV-3 is developed in Excel as a table.

### 10.2.1 Pre-Development Tasks

The tasks that must be completed prior to OV-3 development and/or maintenance are:

- Identify all ICOMs associated with the leaf-level Operational Activities assigned to each Operational Node of interest to the BEP (Only Inputs, Outputs and assigned Controls are considered.)
- Define IEs using the same definitions as their corresponding ICOMs.
- Review and analyze the “from-to” Operational Activity relationship for each IE. Determine the direction and exchange of information between Operational Nodes.
- Identify Logical Entities and/or Attributes associated to IEs.
- Identify Information Assurance Characteristics and Attributes associated to IEs.

## 10.2.2 Development Tasks

Generation of the Operational Information Exchange Matrix is generated using the OV-2/3 auto generation tool for SA.

### 10.2.2.1 Creating/Modifying the OV-3

- Run the OV-2/3 generation tool
- Click on the OV-3 icon, then the “OV-3 Wizard – [Step 1]” screen will be displayed
- Retrieve the development Encyclopedia UDL for the “UDL File” tab
- Click the “Next>” command, then the “OV-3 Wizard – [Step 2]” screen will be displayed
- To generate the whole set of the OV-3 architecture products, select (or check) “OV-2 Diagrams(s)”
- To generate part of the OV-3 architecture products, select specific items
- Click the “Next>” command, then the “OV-2 Results” screen will be displayed
- Click the “Start” command, then the “OV-3 Wizard – [Step 3]” screen will be displayed
- Check the default option – Include OV-7 Entities (Referenced Data) in the Report
- Choose the file directory for the final Excel File location
- Click the “Next>” command. then the “OV-3 Generator Results” screen will be displayed
- Click the “Start” command

### 10.2.2.2 OV-3 Model Coordination with Stakeholders

- Perform impact analysis where a change in other products may affect the OV-3. If a change is made to OV-3 products, notify the owner of other products.
- Validate OV-7 Logical Entities/Attributes to IEs.
- Validate the Information Assurance Characteristics and Attributes to IEs.
- Verify each linkage with the appropriate SA report.

### 10.2.2.3 Modeling Cleanup

- Review, refine and modify the Operational Information Exchange Matrix.
- Perform internal peer review to validate the OV-3.
- Incorporate peer review recommendation and obtain approval for the OV-3 product.

## 10.2.3 Post-Development Tasks

These tasks are performed after changes to the OV-3 by the Stakeholders to ensure integration of the architecture:

- Conduct a product review to ensure that the OV-3 products adhere to the APG, have clean BART reports and comply with the *OV-3 Product Checklists*.
- Incorporate quality control and Architecture Verification changes to BEA.
- Incorporate recommendation from the peer reviews and obtain final approval.

## 10.3 Modeling OV-3 Products Using SA

### 10.3.1 Modeling Conventions

The OV-3 is developed in tabular form, as illustrated Table 10-1, Example of an Operational Information Exchange Matrix listing the object types on Section 10.1.4

### 10.3.2 Modeling OV-3 Objects

The following is a description of the standards and guidelines for the OV-3 objects:

#### 10.3.2.1 OV-3 Primary Objects

- Need Line
  - The Need Line shall contain the name of the Need Line; the column cannot be blank.
  - Need Line names shall consist of the sending Operational Node name, a space, a dash, a space and the receiving Operational Node name.
  - A Need Line must be associated with at least one IE.
- Information Exchange
  - The Information Exchange column cannot be blank.
  - Information Exchange Names shall be title-case, use only approved acronyms and can use only the special character “-”.
  - The Information Exchange column shall contain the name of the IE.
  - Represent every OV-5 Input and Output that is linked to a leaf-level Operational Activity as an IE.
  - The OV-5 leaf-level Inputs and Outputs are related one-to-one to the IE by a unique name.
- Source Node
  - The Source Node column cannot be blank.
  - The Source Node column shall contain the name of the Source Node for the IE from the OV-2.
  - The Source Node must contain the sending Operational Activity from the OV-5 that corresponds to the Output ICOM related to the IE.
- Source Activity(ies)
  - The Source Activity column cannot be blank.
  - The Source Activity name in the OV-3 shall be a valid leaf-level Operational Activity from the OV-5.
  - The Source Activity shall have as an Output the ICOM that corresponds to the IE.
- Destination Node
  - The Destination Node column cannot be blank.
  - The Destination Node column in the OV-3 shall contain the name of the Destination Node for the IE from the OV-2.
  - The Destination Node shall contain the receiving Operational Activity from the OV-5 that corresponds to the Input ICOM related to the IE.
- Destination Activity(ies)
  - The Destination Activity column cannot be blank.

- The Destination Activity in the OV-3 shall be a valid leaf-level Operational Activity from the OV-5.
- The Destination Activity shall have as an Input the ICOM that corresponds to the IE.
- Referenced OV-7 Entity(ies) / Attributes
  - The Referenced Data column cannot be blank.
  - The Referenced Data column shall contain one or more data Entities/Attributes from the OV-7 that are linked to the IE.
  - Each IE in the OV-3 shall be linked to at least one data Entity/Attribute in the OV-7.
- Information Exchange Description
  - The Information Exchange Description column cannot be blank.
  - The Information Exchange Description column shall contain the textual definition of the IE.

### 10.3.2.2 OV-3 Information Assurance Objects

- Information Assurance (IA) Characteristics and Attributes
  - The three IA characteristics are: Confidentiality, Integrity and Availability. Each characteristic may have one or more values and attributes associated with it, as described below
    - Confidentiality characteristic values are defined as Classified, Sensitive, or Public. For each characteristic value, there are one or more potential attributes. The full range of potential Confidentiality-related attributes is contained in the table below:

Classified	Sensitive	Public
Confidential Secret Top Secret	FOUO Unclassified Technical Data Proprietary Privacy UCNI Foreign DEA Sensitive	Approved for Release

- Integrity characteristics values are defined as High, Medium, or Low. At each level of value, there are four potential attributes; the full range of potential Integrity-related attributes is contained in the table below:

Level of Assurance	Non-repudiation (Sender)	Non-repudiation (Receiver)	Authentication
Mandatory	Mandatory	Mandatory	Mandatory
Discretionary	Discretionary	Discretionary	Discretionary
Not required	Not required	Not required	Not required

- Availability characteristic values are defined as High, Medium, or Low. At each level of value, there are two potential attributes; the full range of potential of Availability-related attributes is contained in the table below:

Timeliness	Level of Effort
Few or No Delays	Preemptive
Delays < 24 hrs	Specified
Delays > 24 hrs	Best Effort

- All IA characteristic and attribute values are assigned by the Stakeholders, and are used to determine the Mission Assurance Category and Confidentiality Level (MAC/CL) for each IE. These determinations indicate the MAC/CL of the system that would be expected to

process, store, or transmit an IE with matching IA characteristics and attributes. DoD allows a total of nine potential MAC/CL combinations, as shown in the table below:

MAC I / Classified	MAC II / Classified	MAC III /Classified
MAC I / Sensitive	MAC II / Sensitive	MAC III / Sensitive
MAC I / Public	MAC II / Public	MAC III / Public

The combination of the Integrity and Availability characteristic values equated to the MAC level, while the Confidentiality characteristic is broken out separately. In this schema, MAC I equates to a requirement for HIGH Integrity and HIGH Availability, MAC II equates to HIGH Integrity and MEDIUM Availability, MAC III equates to LOW Integrity and LOW Availability. For additional information concerning IA Characteristics, their values and their attributes refer to the “IA Methodology Implementation Guidance”. The details of this methodology may be updated in ongoing workshops with stakeholders.

Table 10-3 reflects the IA Tab from the OV-3 Matrix that contains the Information Assurance characteristics of the Information Exchanges.

Table 10-3, Example of Information Assurance Tab

Information Exchange	Confidentiality	Confidentiality Attribute 1	Confidentiality Attribute 2	Integrity	Level of Assurance	Non-repudiation (Sender)	Non-repudiation (Receiver)	Authentication	Availability	Timeliness	Level of Effort	MAC Level
Acceptance Evidence	Publicly Released	Approved for Release		Basic	Not Required	Not Required	Not Required	Not Required	Basic	> 24 Hours	Best Effort	MAC III/Public
Acceptance Information												
Apportionment												
Approved Apportionment												
Approved Payment Request	Sensitive	Unclassified Technical Data		Basic	Not Required	Not Required	Not Required	Not Required	Basic	> 24 Hours	Best Effort	MAC III/Sensitive
Award Order Requirement												
Awarded Agreement												
Awarded Contract	Sensitive	Unclassified Technical Data		Basic	Not Required	Not Required	Not Required	Not Required	Basic	> 24 Hours	Best Effort	MAC III/Sensitive
<p>The information assurance (IA) characteristics and attributes associated with this Information Exchange (IE) were developed as part of a pilot project and are for reference only. They are provided to assist DoD Program Managers' with determining which of the DoD's information security controls baselines are appropriate to their information systems in light of the consequences that could result from the unauthorized disclosure, modification, or loss of availability of the IE or the information system.</p> <p>The IA characteristics and attributes associated with this IE are not intended to be used by Investment Review Boards (IRBs) or certification authorities (CAs) as a definitive checklist for controls assignments, or to dictate implementation solutions. The assignments provided in the architecture are for reference and represent typical IA attribution. Actual attributes may be higher or lower depending on business or system context.</p>												

### 10.3.3 OV-3 Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 10.3.3.1 OV-3 Lessons Learned

The following lessons learned have been and serve as the basis for the OV-3 on Appendix B:

- The OV-5 Operational Activity Model must be stabilized across all BEPs.
- All Operational Nodes must be identified.
- All leaf-level Operational Activities must be assigned to Operational Nodes.
- An IE must be assigned to each Input or Output ICOM associated with a leaf-level Operational Activity.
- All new or modified leaf-level Input or Output ICOMs (IEs) must have associated source and destination Operational Activities.
- All External Operational Activities must be identified and labeled as “Process.... Information.”
- External Operational Activities must be linked to ICOMs via an ICOMs property sheet.
- All OV-5 Operational Activity diagrams must be balanced.
- The linkages from the Context Diagram to the leaf-level diagrams must be consistent and well defined.
- All exception reports must be reviewed and resolved.

#### 10.3.3.2 OV-3 Common Pitfalls

The following are common mistakes in the use of Excel that could affect the development lessons learned have been and also serve as the basis for the OV-3 Checklist on Appendix B:

- ICOMs in the OV-5 Diagrams are not well defined or linked across different diagrams.
- ICOM Arrows are not touching Operational Activity boxes; the Auto generation tool will look for all the ICOMs touching an Operational Activity.
- IE descriptions contain special characters such as a carriage return code or acronyms not in the AV-2.
- OV-7 Data Columns contain special characters or acronyms not defined in the AV-2.
- IA characteristic and attribute assignments are not assigned to leaf-level IEs.
- IE IA characteristic and attribute assignments are not in agreement with their analogous MAC/CL assignments.



# 11 SV-1 – Systems Interface Description

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## 11.1 Summary Description

This section describes the System Interface Description, its relationship to other BEA products, the development method, and the modeling guidelines to be followed.

The SV-1 System Interface Description model depicts System Nodes, the systems resident at these nodes and System Interfaces needed to implement the automated Information Exchanges referenced by the OV-2 Operational Nodes and corresponding Need Lines.

### 11.1.1 Product Purpose

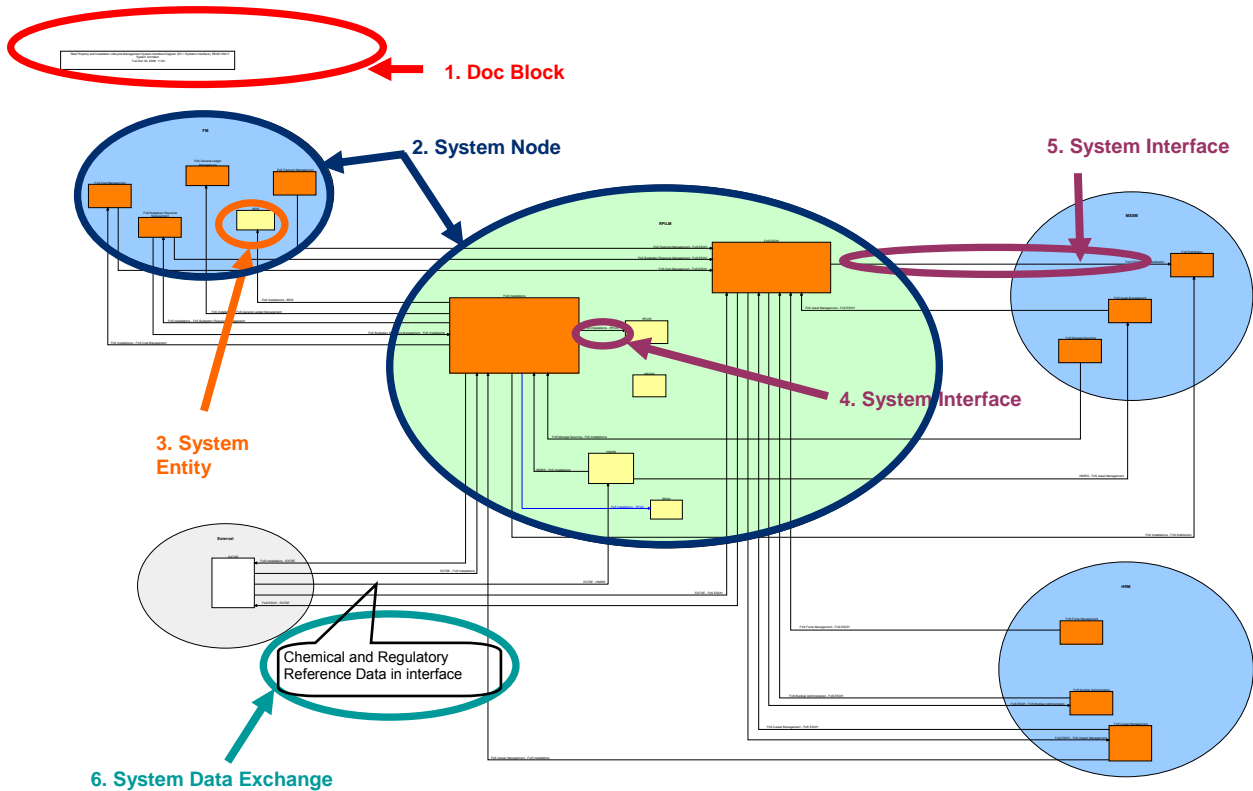
The System Interface Description is product to display the relationships of Systems to Systems Functions, Systems to System Nodes, and the interfaces between Systems. The SV-1 is a bridge between the Operational View and Systems View of the architecture. The SV-1 System Nodes are linked to the OV-2 Operational Nodes, the System Data Exchanges on the system interfaces are linked OV-3 Information Exchanges, and Systems Interfaces to Need Lines in the OV-2, thus integrating the operational view business requirements and systems view that supports these requirements.

### 11.1.2 Product Structure

The SV-1 product is depicted as a set of diagrams. It comprises System Nodes, System Entities, and System Interfaces, as described in the following sections. For the BEA, individual SV-1 diagrams are developed for each CBM and for the External Node. Each CBM has a System Node that represents a set of systems and functions performed by DoD for a specific line-of-business. The External Node represents non-DoD systems and federally mandated systems that interface with the CBM systems. In each SV-1 diagram, an oval in the center of the diagram represents the focus CBM or External System Node. All other peripheral System Nodes, CBM or External, that exchange information with the focus System Node are presented on the CBM-specific SV-1 diagram. The focus System Node includes the CBM identified Enterprise Systems and Family of Systems along with their supporting system interfaces. Each peripheral system node will only include systems that interface to the focus node. The System Interfaces on each model depict both internodal and intranodal exchanges of information with the focus node in support of Business Capabilities shown in the Operational Views.

Figure 11-1, SV-1 Model for Real Property and Installations Lifecycle Management CBM, is an example of an SV-1 Systems Interface Description model for the Real Property and Installations Lifecycle Management (CBM).

Figure 11-1, SV-1 Model for Real Property and Installations Lifecycle Management CBM



Individual SV-1 diagrams are developed for each CBM and the External node. The objects used to represent the SV-1 product are numbered as shown in Figure 11-1. The main features of this diagram are:

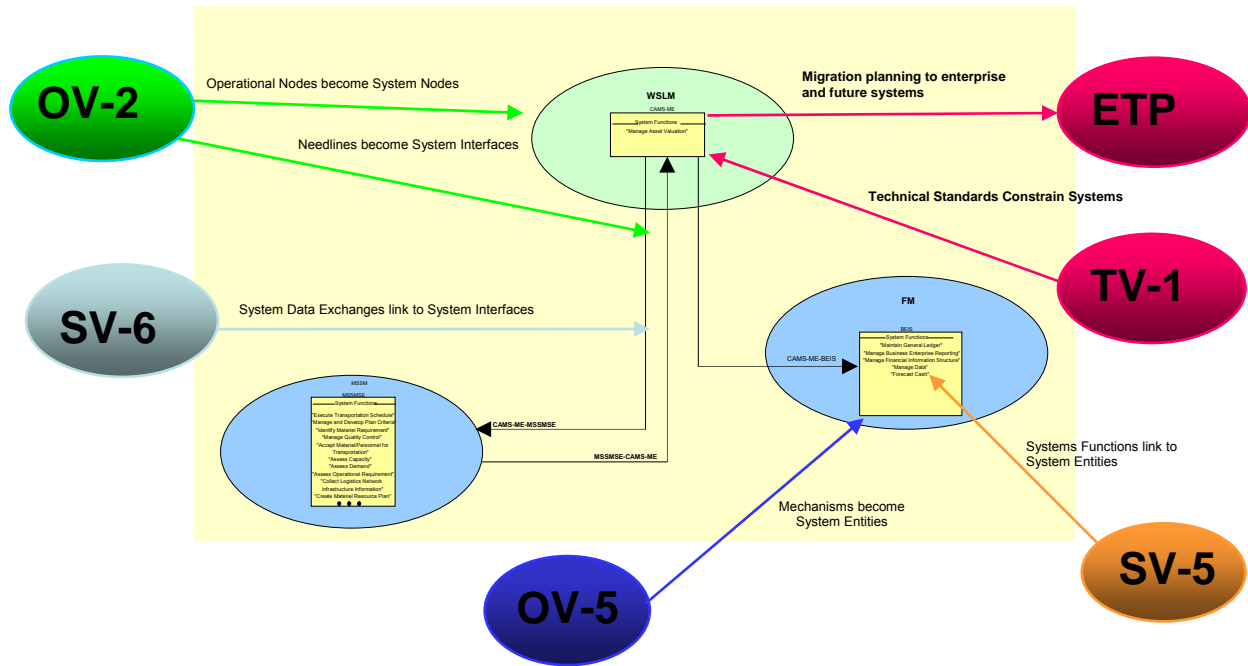
- **Doc (title) block (1)** is located in the upper left corner of the diagram. The title block contains the diagram name and is named after the focus CBM (“Real Property Lifecycle Management”), type “(SV-1 Systems Interface)” and last modification date.
- **System Nodes (2)** are the large oval shapes in the diagram that are named after the CBM. The SV-1 diagram name represents the focus System Node.
- **System Entities (3)** are the rectangles contained within each System Node. They represent the DoD CBM enterprise or Family of Systems, and external systems including federally mandated systems.
- **System Interface (4), (5)** are the directional lines between the System Entities. They represent intranodal communications between systems within a System Node (4) and internodal communications between systems across System Nodes (5).
- **System Data Exchanges (6)** represent a collection of system Data Elements that System Functions produce or consume. In the BEA implementation of the SV-6, information assurance and performance characteristics of the exchange are not provided.

### 11.1.3 Relationship to Other BEA Products

As illustrated in Figure 11-2, the SV-1 is related to other BEA products as follows: This graphical product describes systems and interconnections providing for, or supporting, both DoD warfighting and business functions. The SV-1 associates systems resources to the business requirements in the OV products. These system resources are based on the Operational Activities and facilitate the automated portions of the Information Exchange among Operational Nodes.

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the SV-1 is affected by the release.
<b>AV-2</b>	All SV-1 terms with specific meaning must be defined in the AV-2 Terms Definition list. These terms must include, as a minimum, all object types included in the deliverable.  All acronyms used in the SV-1 system interface descriptions must be listed and spelled out in the AV-2 Acronym Definitions report.
<b>OV-2</b>	In the BEA, System Nodes in the SV-1 are directly derived from the Operational Node of the OV-2. This is to clearly show that the systems contained in that System Node are required to support the Operational Activities performed at the corresponding Operational Node. Similarly, one or more System Interfaces in an SV-1 have a corresponding Need Line in an OV-2, thus showing the relationship between information flows and system data dependencies. Each OV-2 Need Line is comprised of Information Exchanges with their associated characteristics. As OV-2 Need Lines are comparable to SV-1 System Interfaces, IEs on those Need Lines are comparable to the System Data Exchanges on the System Interface.
<b>OV-3</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and SV-1.
<b>OV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and SV-6.
<b>OV-6a</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and SV-1.
<b>OV-6c</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and SV-1.
<b>OV-7</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and SV-6.
<b>SV-5</b>	The SV-5 links Business Capabilities and their Operational Activities to the System Functions and System Entities that supports them. These links are reviewed in SV-1 development to ensure the SV-1 interfaces are valid.
<b>SV-6</b>	The SV-6 describes the detailed characteristics of the System Data Exchanges assigned to the System Interfaces on the SV-1.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and SV-1.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the SV-1 and the DFMIR/FFMIA Guidance Model.

Figure 11-2, Relationships Between SV-1 and Other BEA Products



**Note:** Planned steps for either migrating the current suite of systems to a more efficient suite, or evolving a current system towards a future implementation are presented in the ETP. These future systems are identified as System Entities on the SV-1 and are detailed in the System Migration Summary Spreadsheet, of the ETP. Once an enterprise system is fully implemented it is removed from the ETP or the Congressional Report but will remain within the BEA architectural products until a replacement is identified.

### 11.1.4 SV-1 Product Definitions

The following are definitions of the key elements contained in the SV-1:

1. **System Node:** A BEA System Node represents one or more systems that work together within a Core Business Mission to support the automated portion of the business requirements described in the Operational View.
2. **System Entity:** System Entities represent DoD systems and their key external system connections. In the BEA, System Entities are identified as being enterprise systems, a Family of Systems (FoS) or external systems. An enterprise system is a system that has been identified as the standard across the DoD. The Family of Systems is a set or arrangement of independent systems that can be arranged or interconnected in various ways to provide different CBM capabilities. A FoS is used in the BEA to show connections between component and enterprise systems. An external system represents a system that is not in the BEA but that does interface with systems within the BEA.
3. **System Interface:** System Interfaces represent the data exchange between System Entities.
4. **System Function:** System Functions are the actions the system takes to transform data input into a data output in accordance to the Business Rules. It supports the automated portion of Operational Activities.
5. **System Data Exchange (SDE):** System Data Exchanges represent a collection of system Data Elements that System Functions produce or consume.

## 11.2 Developing the SV-1 Products

This section describes the approach to develop, extend and maintain the SV-1. The SV-1 is developed in System Architect as a diagram.

The SV-1 model development begins concurrently with the development of the OV-5 and OV-2 products and continues after the completion of these products. The development is done in collaboration with the Stakeholders and, when necessary, DoD Program Managers who are responsible for the enterprise systems. Pre-development sessions and formal workshops are held with Stakeholders to identify and define system functionality represented by Enterprise Systems in the BEA.

The System View represents the business requirements in the Operational View products. The SV product analysis is conducted to ensure, for example, that OV business requirements represented as information exchanges become system data exchanges placed on system interfaces.

During the pre-development period, the Stakeholders are provided with worksheets to collect information about their enterprise systems from the Program Managers and their community of interest. During development this information is analyzed, along with changes to Operational View products, to create the SV-1 products.

### **11.2.1 Pre-Development Tasks**

The tasks that must be completed prior to SV-1 development and/or maintenance are:

1. The BEP representative is provided a copy of the existing SV-1 diagram and definitions. The BEP representative is responsible for identifying the BEP mission thread, defining information and data standards needed to implement the threads and defining the System Functions (automations) that systems provide in support of those threads.
2. The BEP representative determines the appropriate enterprise systems and, if applicable, contacts the responsible Program Manager for the following information about their enterprise systems:
  - Enterprise system name and description
  - System Function(s) performed
  - Interfacing systems and definition
  - System Interfaces and SDEs with definitions
  - SDEs and associated Data Elements
  - Applicable data standards needed for implementation
3. The Program Managers provide information on their respective Enterprise System to their CBM representative. The CBM representative reviews the information and provides it to the Architecture Development Team for analysis and inclusion in the BEA.
4. As part of the pre-workshop activity the Architecture Development Team works with the BEP representative to ensure that any new business requirements are represented in the system requirements and that any new system requirements are also reflected in the Operational View business requirements. A tight link between the SV-1 and the OV-5, OV-2 and OV-3 is maintained to ensure that the System View is integrated with the BEP business requirements.

### **11.2.2 Development Tasks**

The development and maintenance of the System Interface Diagram is accomplished in facilitated workshops that include Government SME participation to address content and validate results. The following subsections describe the approach used to develop the SV-1 in the BEA. Each subsection sets forth the specific tasks that must be accomplished to in each stage of the development phase. Although most of these steps are sequential, it is common to start some steps before a previous step is completed.

#### **11.2.2.1 SV-1 Analysis Tasks**

Prior to any changes, an impact analysis is conducted to assess the impact of new or revised business requirements to the SV-1. The following impact analysis tasks are performed:

1. For creation or any changes to Systems Nodes:
  - Assess impact to OV-2 Operational Node.
  - Verify that the system entities with supporting system functions within the System Node supports the operational activities resident in the Operational Node.
  - Determine if the Operational Node definition needs to be refined.
  - Verify that the OV-2s support the CBM/Program Manager provided System Interfaces and SDEs.
  - Verify that the OV-3 Information Exchanges support proposed System Data Exchange assignments to system interfaces in the SV-1.
  - Assess impact to OV-5.
  - Assess impact to other CBM SV-1 diagrams.
  - Verify that other SV-1 diagrams support the required System Node and System Interfaces.
2. For creation or changes to System Entities:
  - Assess impact to OV-5 models.
  - Verify that enterprise systems appear as Mechanisms on corresponding Operational Activities in the OV-5 models.
  - Assess impact to System Nodes.
  - Assess impact to other SV-1s diagrams.
  - Assess impact to System Functions.
  - Assess impact to Enterprise Sub-Services.
  - Assess impact to BEP team Stakeholders.
  - Assess impact to CBM team Stakeholders.
3. For creation or changes to System Interfaces:
  - Assess impact on OV-2 models.
  - Assess impact on OV-5 models.
  - Assess impact to System Interface name.
  - Assess impact to SDEs.
  - Assess impact to IE.
  - Assess impact to Data Entities.
  - Assess impact to BEP Stakeholders.
  - Assess impact to CBM Stakeholders.

#### **11.2.2.2 Creating / Modifying SV-1 Diagrams**

This section describes the approach to develop the SV-1.

##### **11.2.2.2.1 Review the SV-1 Product for Internal Consistency**

Because the OV-5, OV-2 and OV-3 are so closely linked to the SV-1, the SV-1 is completed after the OV models are stabilized. The OV and SV models must be in accord. The following rules apply for the creation of a valid SV-1 diagram.

- All SV-1 interfaces must be supported by an OV-2 Need Line.
  - If the BEP has transactions between a FoS system and an Enterprise system, the interface will be shown on the SV-1 diagram, e.g. FoS ESOH – RPAD.
  - If the BEP has transactions between Enterprise systems the interface will be shown on the SV-1 diagram, e.g. WAWF – CAMS-ME.
  - If the BEP has transactions between FoSs, the interface will be shown on the SV-1 diagram, e.g. FoS Payment Management – FoS General Ledger Management.
- For each system interface the sending system entity must reside in the system node that corresponds to the sending operational activity's operational node.
- All SDEs must have a corresponding OV-3 IE.
- For each SDE the sending system entity must share a system function with the corresponding sending operational activity and the receiving system entity must share a system function with its corresponding receiving operational activity.
- Each System Node must be associated with a corresponding Operational Node.
- All SV-1 enterprise systems must be represented by a corresponding OV-5 ICOM mechanism.

#### **11.2.2.2.2 Create the SV-1**

The tasks that must be completed to produce an SV are:

1. Create a new diagram or open an existing diagram.
2. The following procedures are used for creating the various elements of the SV-1:
  - To create System Nodes:
    - Analyze OV-2 Operational Nodes
    - Create a System Node for each CBM
    - Define System Node
    - Map System Node to OV-2 Operational Node
  - To create System Entities:
    - Name System Entity
    - Define System Entity
    - Assign System Entity to System Node
    - Assign System Functions. Note: System functions do not display on the SV-1 diagrams, but are included in the HTML visualization of the system entities.
    - Designate as an Enterprise Service(s) (enterprise services only)
    - Assign BEP team Stakeholders (enterprise systems only)
    - Assign CBM team Stakeholders (enterprise systems only)
    - Ensure all enterprise systems are represented as mechanisms in the OV-5.
    - Ensure that system functions are only assigned to decomposed leaf level operational activities on OV-5 diagrams.
    - FoS is not required to be a mechanism on the OV-5 leaf level operational activities.

- FoS represents federation touch points to the CBM mechanism on the OV-5 leaf level operational activities.
- To create SDEs:
  - Name SDE after corresponding IE. Note: There is a many to one relation from SDEs to IEs. If only one SDE exists, the name will be the same as the IE. If multiple SDEs are linked to the IE different SDE names will be used.
  - If the IE name ends in “information” the last word of the SDE will be changed to “data”, e.g. IE - Disbursing Information, SDE – Disbursing Data.
  - Define SDE by using the definitions of the corresponding IE or select manual and enter the new definition.
  - Assign BEP team Stakeholder
  - Assign Data Elements
  - Link SDEs to IEs. Ensure that the SDE has a corresponding IE and the IE is resident of a Need Line that corresponds with the system nodes for the system interface that carries that SDE.
- To create System Interfaces between systems:
  - Name System Interface. The abbreviation of the source system entity and destination system entity is concatenated to form the system interface name.
  - Define System Interface.
  - Assign SDEs to System Interfaces. SDE’s must be placed in system interfaces as described in “Link SDEs to IEs” above.

#### 11.2.2.2.3 Update the SV-1

Following analysis of any changes to the OV products, existing SV-1 content shall be updated to reflect any impact of these changes. This may require creation or update of System Nodes, System Entities, SDEs or System Interfaces to the SV-1 product. For example, the addition of a new leaf-level output ICOM in the OV-5 will require the creation of a new system data exchange.

The tasks that must be completed to update the SV-1 are:

1. Changes to Operational Activity ICOMs:
  - If a new leaf-level input or output ICOM is added to an OV-5, check to see if an IE was created. If there is an IE, identify the Need Line in the OV-2 where the IE is associated. Identify the System Interface that maps to the Need Line. Determine if there is an existing SDE that maps to the IE. If the SDE exists, map it to System Interface. If not, and the IE is to be automated, create a new SDE and map it to System Interface.
  - If a leaf-level ICOM is deleted from an OV-5, identify the IE that maps to the ICOM. Identify the Need Line in the OV-2 where the IE is associated. Identify the System Interface that maps to the Need Line. Identify the SDE that maps to the IE. Delete the SDE from the System Interface.
  - If the leaf-level ICOM definition has been revised, identify the supporting SDE, review the definition and revise as necessary.
2. Changes to Operational Activity:
  - If a leaf level Operational Activity is added to an OV-5 diagram, check to determine if an existing System Function may support the activity. If there is a System Function, review definition and revise as necessary. Otherwise, create new System Function to support the Operational Activity if it is to be automated.



- If a System Mechanism is added to a leaf-level operational activity on any OV-5 diagram, check to see if the system exists. If not, create a new System Entity and add System Functions associated to the Operational Activity.
3. Changes to Operational Node
    - Assess impact to System Node: Determine if System Node exists or one has to be created. If it exists, verify that the definition supports the Operational Node and revise as necessary. If the node does not exist, create node on each CBM specific SV-1 based on revisions to the OV-2 product.
  4. Changes to Need Line on the Operational Node:
    - If a Need Line is deleted, identify the System Interface that maps to the Need Line and delete.
    - If a Need Line is added, determine if an existing System Interface maps to the Need Line. Create a new System Interface if there is not an existing System Interface, provided the Need Line represents an automated exchange.
    - If an unexpected System Interface appears on the SV-1, an analysis of the OV products will be required to determine the corrective action that must be made to the OV or SV-1 products.
  5. Changes to IE:
    - If an IE is added, identify the Need Line where the IE will be added. Determine if there is an existing SDE or if a new SDE needs to be created. Link the new SDE to the System Interface.
    - If an IE is deleted, identify the System Interface that maps to the Need Line where the IE is being deleted. Delete the SDE from the System Interface.

### 11.2.3 Post-Development Tasks

These tasks are performed after changes to the SV-1 by the Stakeholders to ensure integration of the architecture.

1. When a SV-1 diagram is updated, make updated diagrams available to the Stakeholders to review, identify corrections, and finalize acceptance of the product.
2. Verify all SV-1 acronyms are in AV-2.
3. Verify that all SV-1 Enterprise-level systems, Enterprise-wide systems and Component-level systems are in the Enterprise Transition Plan.
4. Review changes to the OV-2, OV-3 and OV-5 products and follow the SV-1 tasks that are mentioned in section 11.2.2.2.

Moreover, Quality Assurance checks are conducted to prepare for the formal quality assurance tasks conducted by IV&V group and Stakeholder review. The SV-1 Product Checklist is used to verify that the content is in accordance with the SV modeling guidelines. The major checks to ensure compliance include:

1. Spelling of all objects within the diagram is correct.
2. System Interfaces are connected to System Entities.
3. System Nodes are identified as Physical (within Abstract)
4. System Entities are within System Nodes.
5. System Nodes are associated with at least one System Entity.
6. Each System Node references at least one Operational Node.
7. Each System Entity has a definition in the System Entity dictionary.
8. Any System Entity that provides a Service must have the “Service Provider” flag in the system entity definition artifact set to “Yes”.

9. Each enterprise System Entity is associated with at least one System Function. System functions do not display on the SV-1 diagrams, but are included in the HTML visualization of the system entities.
10. Each System Interface has a definition.
11. Each System Interface references at least one SDE.
12. Each SDE has a description of the data it represents that is based on the Information Exchange definition it supports.
13. Each SDE is linked to an IE.
14. At least one SDE is assigned to every System Interface.
15. Complete the SV-1 Checklist.

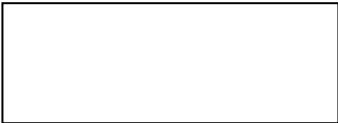
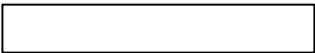

## 11.3 Modeling SV-1 Products Using SA

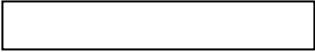

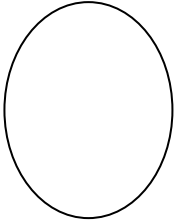
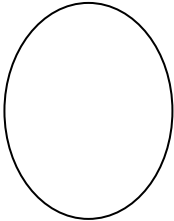
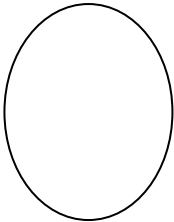
### 11.3.1 Modeling Conventions


#### 11.3.1.1 Use of Color, Size and Lines in Diagram

The following modeling conventions must be used to create the SV-1. The SV-1 diagrams use a standard color scheme, font and line size as follows:

**Table 11-1, Modeling Guidelines for the System Interface Diagram**

Element	Symbol	Format
Doc Block	Text Box: 	<i>Position: Upper Left Corner</i> <i>Border: Solid Black</i> <i>Fill: None</i> <i>Text:</i> <i>Color: Black</i> <i>Font: Arial</i> <i>Size: Default</i>
System Entity	Rectangle: 	<i>Border: Solid Black</i> <i>Fill: BEP Dependent</i> <i>Text:</i> <i>Color: Black</i> <i>Font: Arial 10, black</i> <i>Size: Default</i>
Enterprise Level System Entity	Rectangle: 	<i>Border: Solid Black</i> <i>Fill:</i> Yellow boxes with a black border. The custom color settings are: Hue/Sat/Lum – 40/240/192 or Red/Green/Blue – 255/255/153 <i>Text:</i> <i>Color: Black</i> <i>Font: Arial 10, black</i> <i>Size: Default</i>

<i>Family of Systems</i> <i>System Entity</i>	<i>Rectangle:</i> 	<i>Border: Solid Black</i> <i>Fill:</i> Light orange boxes with a black border. The custom color settings are: Hue/Sat/Lum – 20/240/120 or Red/Green/Blue – 255/128/0  <i>Text:</i> <i>Color: Black</i> <i>Font: Arial 10, black</i> <i>Size: Default</i>
<i>Non-DoD</i> <i>System Entity</i>	<i>Rectangle:</i> 	<i>Border: Solid Black</i> <i>Fill:</i> White boxes with a black border.  <i>Text:</i> <i>Color: Black</i> <i>Font: Arial 10, black</i> <i>Size: Default</i>
<i>Central System Node</i>	<i>Elliptical:</i> 	<i>Border: Solid Black</i> <i>Fill:</i> Light green fill and a black border. The custom color settings are: Hue/Sat/Lum – 140/240/192 or Red/Green/Blue – 204/255/204  <i>Text:</i> <i>Color: Black</i> <i>Font: N/A</i> <i>Size: N/A</i>
<i>External System Node</i>	<i>Elliptical:</i> 	<i>Border: Solid Black</i> <i>Fill:</i> Light gray fill and a black border. The custom color settings are: Hue/Sat/Lum – 160/0/225 or Red/Green/Blue – 239/239/239  <i>Text:</i> <i>Color: Black</i> <i>Font: N/A</i> <i>Size: N/A</i>
<i>GSA System Node</i>	<i>Elliptical:</i> 	<i>Border: Solid Black</i> <i>Fill:</i> Light blue fill and a black border. The custom color settings are: Hue/Sat/Lum – 40/240/210 Red/Green/Blue – 255/255/191  <i>Text:</i> <i>Color: Black</i> <i>Font: N/A</i> <i>Size: N/A</i>

<i>System Interface</i>	<i>Arrow:</i> 	<i>Border: Solid Black</i> <i>Fill:</i> <i>N/A</i> <i>Text:</i> <i>Color: Black</i> <i>Font: N/A</i> <i>Size: N/A</i>
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Additional guidance that applies to a system interface is provided below.

- System Interface labels will be placed, where possible, above the horizontal line and closest to either the arrowhead or 90 degree angle.
- System Interface line intersections are permissible, but should be minimized to the extent possible.

#### 11.3.1.2 Diagram Conventions

Each SV-1 diagram shall have a Diagram Description contained within the Description block of the diagram properties that describes the purpose of the diagram, the CBM enterprise and federally mandated systems Information.

- A Doc Block representing header information for the diagram (including the diagram name and date last updated) is placed at the top center of every diagram. The Doc Block is enlarged so there are no truncation indicators (dots) indicating text is not visible. The Doc Block is a box with no fill color and has a black border.
- The SV-1 diagram shall not have a border.
- Each diagram is named after the CBM (for example, Weapon System Lifecycle Management).

#### 11.3.1.3 Object Naming Conventions

Each SV-1 diagram uses standard object naming conventions as follows:

- The System Node name shall be the CBM acronym as used in the OV-2 to name the corresponding Operational Node, excluding the External Node and its subnodes.
- System Entity names are the official CBM acronyms, a Family of Systems of the CBM, or a federally mandated system acronym.
- The System Function form is a verb followed by a noun.
- System Entity names are used to create System Interface names. The naming convention for System Interfaces is “sending System Entity acronym” - “receiving System Entity acronym”.
- Each System Interface name shall only use approved acronyms, non-plural and use no special characters except “-”.
- The SDE names shall be provided by the BEP representatives. If they are not provided, the name of the IE that the SDE is linked to shall be used.
- An IE ending with “Information” will link to a SDE with the same name ending with “Data”.

### 11.3.2 Modeling SV-1 Objects

The following guidelines are used to create or modify the SV-1.

- Modeling objects shall not have truncated entries on the diagram.

- All System Node labels shall be centered at the top of the System Node border and the label should not fall outside the boundary of the ellipse.
- Each System Node name shall be title-case, use only approved acronyms, non-plural and use no special characters except “-”.
- All System Entity labels should be centered at the top of the System Entity box and the label should not fall outside the box boundary.
- All System Entities must be contained within their associated System Node elliptical boundary.
- Each System Entity name shall be upper-case or title-case, use only approved acronyms, non-plural and use no special characters except “-”.
- Each System Node may contain a Family of Systems Entity to represent current and future CBM systems that have not been identified for the current release of the BEA architecture.
- The central node of each SV-1 diagram will contain the enterprise systems and any CBM FoS that have been identified.
- The SV-1 peripheral nodes will only include systems that interface to the central node.
- A text display “Service Provider” will be added to any system that provides a service.
- Each System Entity must have a Parent system assigned, e.g. CCR parent would be Federal IAE and Defense Acquisition Management Information Retrieval (DAMIR) parent would be DAMIR. For a System Entity with no Parent system, use the system entity name as the Parent system, e.g. BEIS parent would be BEIS.
- The system level of a System Entity must be set to “TOC”.
- System Interface lines are not permitted to traverse intermediate System Entities. To the maximum extent possible, System Interface lines shall not cross intermediate System Nodes.
- System Interface arrows shall be black with black filled arrowheads.
- Each end of a System Interface line must be connected to a System Entity.

### 11.3.3 SV-1 Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 11.3.3.1 SV-1 Lessons Learned

The following lessons learned have been and serve as the basis for the SV-1 no Appendix B.

- Ensure that the SV-1 analysis occurs concurrently with OV-5 development; ensure system mechanisms are properly assigned to Operational Activities that they automate.
- Regular and early communication with other architecture development teams is needed to assess impact of proposed changes in other products on the SV-1. The SV team will actively participate in the pre-analysis workshops to ensure that changes in the Operational View business requirements can be properly reflected in the System View.
- Standard color coding of diagrams during the workshop is useful for participants to identify where content was added, changed or deleted. Standard color coding should be in line with that used in the BEA Compare reports.
- All exception reports must be reviewed and resolved.

### 11.3.3.2 SV-1 Common Pitfalls

The following common mistakes in the use of SA that could affect the development lessons learned have been and also serve as the basis for the SV-1 Checklist on Appendix B:

- Acronyms in system entity descriptions not included in AV-2.
- Provide enough time in the original schedule to incorporate late changes in the OV-2, OV-3 or OV-5 products. Often adequate time to complete impact analysis or post development tasks to modify the SV-1 is not available.
- The SV-1 diagrams are not reviewed in the HTML/SVG rendition until after product stabilization, so flaws that do not show up in System Architect, such as superfluous line segments on System Interfaces, are exposed in the web-based version of the architecture. Superfluous line segments are eliminated on the System Interfaces by using the “reduce line segment” feature in System Architect.

# 12 SV-5b – Operational Activity to System Function Traceability Matrix

## 12.1 Summary Description

This section describes the Operational Activity to System Function Traceability Matrix, its relationship to other BEA products, the development method and the modeling guidelines to be followed.

### 12.1.1 Product Purpose

The Operational Activity to System Function Traceability Matrix depicts the relationships between the Operational Activities in the OV-5 Activity Models and the System Functions.

BTA uses the DoDAF SV-5b, hereafter termed the SV-5, to meet a program requirement to link Business Capabilities, Operational Activities and System Functions. The Enterprise-level systems identified by each Stakeholder are shown on the SV-5 matrix, where the Enterprise-level system supports an Operational Activity/Business Capability, and is aligned with a specific System Function.

### 12.1.2 Product Structure

The SV-5 product is depicted as a matrix. It comprises and relates System Functions to Operational Activities across the BEA Business Capabilities. For each matrix cross area or intersection the related Enterprise Systems are presented. There can be many Operational Activities related to a single Business Capability. The matrix is illustrated in Figure 12-1.

Figure 12-1, Example of an SV-5b

SV-5 Operational Activity-to-System Function Matrix						
Legend: System Entity for both Operational Activity and System Function   System Entity for System Function only   System Entity for Operational Activity only   Multiple BEP Related*						
	BEP	Acquisition Visibility				
	Business Capability	Conduct Program Management	Manage Acquisition Oversight Integration			Monitor Commercial Request for DoD Technology Export
		Develop Program	Conduct Acquisition Assessment	Conduct Periodic and Ad-hoc Reporting	Manage Capabilities Based Acquisition	Conduct Science and Technology
	Operational Activity	System Function				
BEP						
Acquisition Visibility	Manage Asset Valuation <sup>a</sup>					
	Manage Capabilities Based Acquisition		DAMIR	DAMIR	DAMIR	
	Manage Cross-Domain Communications					USXPORTS
	Manage End-User Check					USXPORTS
	Manage Mission Support Requirements	DAI, FoS Defense Acquisition Management				
	Manage One-Time Staffing					USXPORTS
	Monitor Auto-Staffing					USXPORTS
	Monitor Contract Performance		DAMIR	DAMIR	DAMIR	
	Perform Acquisition Assessment		DAMIR	DAMIR	DAMIR	
	Perform Basic and Advanced Search of Structured and Unstructured Data					USXPORTS
	Perform Cross-Cutting Analysis and Reporting		DAMIR	DAMIR	DAMIR	
	Perform Data Checks		DAMIR	DAMIR	DAMIR	
	Perform Precedent Search					USXPORTS
	Perform Reporting					USXPORTS

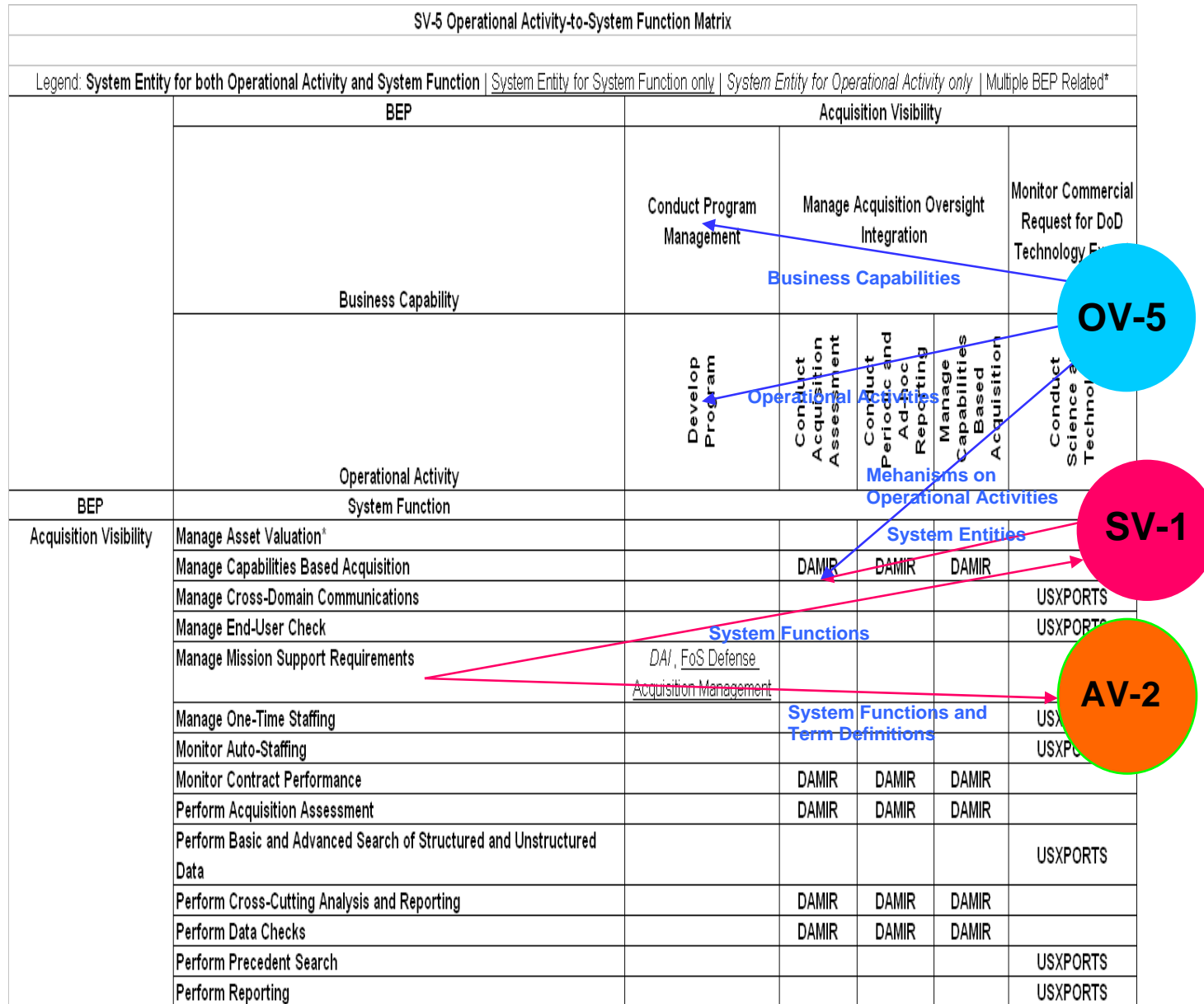
### 12.1.3 Relationship to Other BEA Products

As illustrated in Figure 12-2 and described in the table below, the SV-5 is related to other BEA products as follows.

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the SV-5 is affected by the release.
<b>AV-2</b>	All SV-5 terms with specific meaning must be defined in the AV-2 Terms Definition list. These terms must include, as a minimum, all object types included in the deliverable.  All acronyms used in the SV-5 system function descriptions must be listed and spelled out in the AV-2 Acronym Definitions report.
<b>OV-2</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and SV-5.
<b>OV-3</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and SV-6.
<b>OV-5</b>	OV-5 Operational Activities are linked to the System Functions in the in the SV-5. In addition, Enterprise-level Systems are Mechanisms on the Operational Activities.
<b>OV-6a</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and SV-6.
<b>OV-6c</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and SV-6.
<b>OV-7</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and SV-6.
<b>SV-1</b>	The SV-1 System Entities and supporting System Functions match systems in the SV-5 matrix.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and SV-6.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the FFMIAI Guidance Model and SV-6.



Figure 12-2, Relationships Between SV-5 and Other BEA Products



The Stakeholders and the Architecture Development Team coordinate the components of the SV-5 to ensure integration with other BEA Products.

### 12.1.4 SV-5 Product Definitions

The following are definitions of the key elements contained in the Operational Activity to System Function Traceability Matrix.

1. **Business Capability:** Each capability represents the ability to execute a specific course of action. It can be a single business enabler or a combination of business enablers (e.g. business processes, policies, people, tools, or systems information) that assist an organization in delivering value to its customer.
2. **System Entity:** System Entities represent DoD systems. In the BEA, these systems are identified as being enterprise systems, a Family of Systems or external system. An enterprise system is a system that has been identified as the standard across the DoD. The FoS is a set or arrangement of independent systems that can be arranged or interconnected in various ways to provide different capabilities. An external system represents any system not in the BEA but interfaces with systems within the BEA.
3. **Operational Activity:** An action performed in conducting the business of an enterprise. This is a general term that does not imply a placement in a hierarchy or a timing sequence (for example, it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the Operational Activity Model).
4. **System Function:** System Functions are the actions the system takes to transform data input into a data output in accordance to the Business Rules. It supports the automated portion of Operational Activities.

## 12.2 Developing the SV-5 Products

This section describes the approach to develop, extend and maintain the SV-5. The SV-5 is developed in an Access Database with a web-based front-end using data exported directly from System Architect and is produced as spreadsheet.

A single enterprise matrix represents the SV-5 for all BEPs. The SV-5 provides an integrated architecture depiction of the relationships of Operational Activities to System Functions, and enterprise systems to both Operational Activities and System Functions. Through the mapping of Business Capabilities to Operational Activities, there is an indirect link between System Functions and Business Capabilities.

### 12.2.1 Pre-Development Tasks

The tasks that must be completed prior to SV-5 development and/or maintenance are:

1. Verify that BEA enterprise systems are included in the ETP.
2. Identify leaf-level Operational Activities that are on OV-5 diagrams.
3. Collect System Function information from BEP team leads for each leaf-level Operational Activity on an OV-5 diagram that may be automated.
4. Collect System Function information from BEP team leads for each enterprise system and FoS (optional for FoS).
5. Verify the mapping of System Functions to leaf-level Operational Activities with the BEP team leads.
6. Identify changes in the OV-5 and SV-1 that may impact the SV-5.
7. Identify System Functions that are performed, in whole or part, by an enterprise or FoS systems.
8. Verify mapping of System Functions to enterprise and FoS systems.

## 12.2.2 Development Tasks

The development and maintenance of the Operational Activity to System Function Traceability Matrix is accomplished in facilitated workshops that include Government SME participation to address content and validate results. The following subsections describe the approach used to develop the SV-5 for the BEA. Each subsection sets forth the specific tasks that must be accomplished to in each stage of the development phase. Although most of these steps are sequential, it is common to start some steps before a previous step is completed.

### 12.2.2.1 Creating/Modifying the SV-5 Products

This section describes the approach to develop the SV-5. To create the SV-5 matrix, the following tasks are performed:

1. Analyze definitions of Operational Activities and associated ICOMs.
2. Identify and create System Functions that will support leaf-level Operational Activities on OV-5 diagrams. System Functions must consume the inputs and produce the outputs of the Operational Activity in which they are linked.
3. Analyze System Function name and definition provided by BEP team leads to ensure they support the leaf-level Operational Activities on the OV-5 diagrams.
4. Analyze System Function name and definition provided by the BEP team leads and assign to enterprise systems and FoS to ensure these systems execute the functions assigned.
5. Verify enterprise systems as Mechanisms to Operational Activities.
6. Verify enterprise system shares at least one System Function with the Operational Activity where it appears as a mechanism.
7. Verify mapping of Operational Activities to Business Capabilities.
8. Link System Functions to Operational Activities
  - Use the SV-5 System Function to Operational Activity matrix browser to link a System Function to an Operational Activity.
  - To ensure accurate generation of this SV-5 report, detailed connections between the OV and SV products are necessary. For a system name to appear at the intersection of System Function and an Operational Activity:
    - The Business Capability must be assigned to the Operational Activity of interest.
    - The Operational Activity must show the BEP as a Stakeholder (stakeholder tab)
    - The Operational Activity must have the system as a mechanism – otherwise displays the system entity as underlined. (FoS appears in the intersection as underlined.)
    - The Operational Activity must be assigned to a system function AND the SE must be assigned to at least one of the system functions that are also assigned to the Operational activity. *In other words, the SE and OA must have at least one system function in common.*

To further explain step 8, The SV-5 report generator displays three types of system function/operational activity relationships with a system entity in the report legend. The relationships between these components are explained below.

**System Entity (SE) for both Operational Activity (OA) and System Function (SF)** – The SV-5 report shows the System Entity displayed at the SF/OA intersection in **Bold** when the System Entity appears as a mechanism ICOM on the subject OA in the SV-5 matrix intersection and the OA and SE have been assigned to the same system function present in the intersection.

System Entity for System Function Only -- The SV-5 report shows the System Entity displayed at the SF/OA intersection as underlined when the System Entity is not assigned as a mechanism; the

System Entity is assigned to the system function in the intersection; AND the same system function is also assigned to the OA (through the SV-5 matrix). (The SE is not a mechanism on the OA. *This is where a FoS appears because it is not a mechanism in release 6.0. FoS appears as underlined.*)

*System Entity for Operational Activity Only* -- The SV-5 report shows the System Entity displayed at the SF/OA intersection in *italics* when the System Entity appears as a mechanism on the subject OV-5 Operational Activity AND the OA is assigned to the system function in the intersection AND the SE is **NOT** assigned to the SF at the intersection.

An ICOM mechanism within the context of the SV products means that the System Entity representing the ICOM does the work/creates the outputs of that OA. *If the SE does not share a system function with the OA, it is logically impossible for the SE to do the work it claims.* Remedies include:

- A. Removing the SF from the OA (SV-5 matrix)
- B. Adding the SF is added to the System Entity (SE dialogue box).
- C. Removing the SE from the OA.

9. Finally, the actual generation of the SV-5 matrix has been automated and is available for use as a tool by the BEA. Provided the proper descriptors and links are developed for each SV-5 part, the matrix can be generated automatically. The general application resides at this web location:

<http://bta-beatools.btrads.bta.mil/SV5Generator.asp>

There are several different settings that one may use to generate and view the SV-5. The default setting, the setting that appears when one opens the tool, creates an SV-5 for the entire enterprise. This view is not sorted by BEP.

To create a BEP-specific SV-5, use the BEP drop down list box and select the BEP of interest. Next, in the System Entity/BEP Relationship drop-down list box, select, "Display Only System Entity Related to BEP".

On the SV-5 system functions, operational activity and enterprise systems that support services will be manually bolded.

#### **12.2.2.1.1 SV-5 Matrix Coordination with Stakeholders**

The tasks that must be completed to coordinate with the Stakeholders are as follows.

1. Coordinate with Stakeholders
  - Print copy of SV-5 for Stakeholders to review proposed changes and confirm linkages.
2. Coordinate with the Enterprise Transition Plan team.
  - Compare enterprise systems in the ETP with enterprise systems in SV-5 for consistency.
  - Print copy of SV-5 for the ETP team to review proposed changes and provide comments.
3. Coordinate with BEA SV-1
  - Ensure that any System Function assigned to an enterprise system in the SV-5 is properly aligned to the corresponding System Entity on the SV-1 diagrams.
  - Ensure that System Functions are only assigned to leaf-level Operational Activities on the OV-5 diagrams.
  - Ensure that System Functions are not assigned to any OV-5 Node Tree only Operational Activities.
  - Ensure that any enterprise system that links a System Function to an Operational Activity is a Mechanism on that Operational Activity in the OV-5 diagram (with the exception of a Family of Systems).
  - If an enterprise system is not a Mechanism for an OV-5 Operational Activity, it should not link that Operational Activity to any System Function in the SV-5.

4. Coordinate with BEA AV-2
  - Ensure that all enterprise system acronyms are expanded correctly in the Long Name attribute of the System Entity and in the AV-2.

### 12.2.3 Post-Development Tasks

These tasks are performed after changes to the SV-5 by the Stakeholders to ensure integration of the architecture.

1. Ensure that Names of Operational Activities, System Functions, Business Capabilities and enterprise systems are current and accurate.
2. Add rationalization to the SV-5 to explain any anomalies.

## 12.3 Modeling the SV-5 Products Using SA

### 12.3.1 SV-5 Modeling Conventions

The following modeling conventions shall be used to create the SV-5.

The BEA creates a single SV-5 matrix that represents all CBMs and as well a single diagram for each BEP. A Microsoft Excel worksheet containing one ALL View and six BEP tabs represents the final SV-5 product. The SV-5 product includes Business Capabilities, and identified Enterprise Systems where a System Function supports an Operational Activity. Please note that the ALL View SV-5 is very large and can only be legibly viewed in electronic format. A non-graphic representation of the SV-5 is also created in Excel to facilitate sorts and definition review of the SV-5 components and is titled, "SV-5 Systems Function to Operational Activity Matrix Definitions". This spreadsheet includes definitions for the following objects: CBM stakeholder, Business Capability, Operational Activity, System Function, and System Entity. The first worksheet tab displays the SV-5 in a vertical format and the remaining tabs are displayed in this order; Business Capability, Operational Activity, System Function and System Entity.

#### 12.3.1.1 Modeling Use of Color, Size and Lines in the SV-5 Matrix

The following color, size and line conventions are used to create the SV-5.

- The title of the product is "SV-5b" and appears above the matrix in the spreadsheet header.
- The first row of the SV-5 matrix lists the Business Capabilities and the second row lists the corresponding Operational Activities. Thus, each column of the SV-5b matrix represents a Business Capability and Operational Activity intersection.
- The first column of the SV-5 lists the System Functions and so each row represents a specific System Function.
- The Operational Activities are sorted across the x axis by BEP so that enterprise systems that are relevant to a specific BEP are clustered near each other on the SV-5.
- The System Functions are sorted alphabetically along the Y axis of the matrix.
- All data cells on the ALL View tab are gray.
- In addition to the standard ALL View, the SV-5 matrix is also created for each BEP. In the BEP only diagram System Functions and Operational Activities are both sorted by BEP so that enterprise systems that are relevant to a specific BEP are clustered near one another.
- No color fill color is used on the individual BEP or All View diagrams other than the gray in the ALL View.

#### 12.3.1.2 Matrix Diagram Conventions

The following matrix diagram conventions are used to create the SV-5.

- The names of Business Capabilities, Operational Activities and System Functions in the SV-5 should be consistent throughout the encyclopedia.
- All updates to the SV-5 matrix are implemented through System Architect's Matrix browser, SV-5 System Function to Operational Activity file.
- The SV-5 matrix only contains relationships between leaf-level Operational Activities, Business Capabilities, Enterprise-level systems, including FoS systems and System Functions.
- Every System Function mapped to an Operational Activity shall be reflected in the SV-5 properties tab of the Operational Activity.
- Each System Function must be mapped to at least one leaf level Operational Activity on an OV-5 diagram.
- The SV-5 should list all leaf-level Operational Activities from the OV-5 diagram.

### 12.3.1.3 Object Naming Conventions

The following guidelines are used to create or modify the SV-5.

- Enterprise system names are the official acronyms of the CBM Enterprise Systems and are expanded in the Long Name attribute of the System Entity and in the AV-2.
- The form of the System Function, Operational Activity and Business Capability is a verb followed by a noun.
- The first word and all the main words in System Function, Operational Activity and Business Capability names should have initial capitals, and all the joining words should be left in lower case.

## 12.3.2 Modeling SV-5 Objects

### 12.3.3 SV-5 Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 12.3.3.1 SV-5 Lessons Learned

The following lessons learned have been and serve as the basis for the SV-5 in Appendix B:

- Ensure the settings on the SV-5 generator are set properly prior to SV-5 generation
- Be sure to reformat the Operational Activity row on the diagrams from horizontal to vertical.
- Generate the SV-5 AFTER the OV-5 is stabilized.

#### 12.3.3.2 SV-5 Common Pitfalls

The following are common mistakes in the use of the SV-5 report generator that could affect the development lessons learned have been and also serve as the basis for the SV-5 product checklist in Appendix B:

- Making changes after the SV-5 Change Requests have been voted upon.
- Making any SV-5 changes by hand. These changes are frequently demanded by Stakeholders but are not supported by the data in the operational views and system views.

In general, ensure that all the system function, operational activity, system entity, stakeholder, and business capability links among the operational views and system view are correct.

## 13 SV-6 – System Data Exchange Matrix

### 13.1 Summary Description

This section describes the System Data Exchange Matrix (SV-6) architecture product and its relationship to other BEA products, the development method and the modeling guidelines to be followed.

#### 13.1.1 Product Purpose

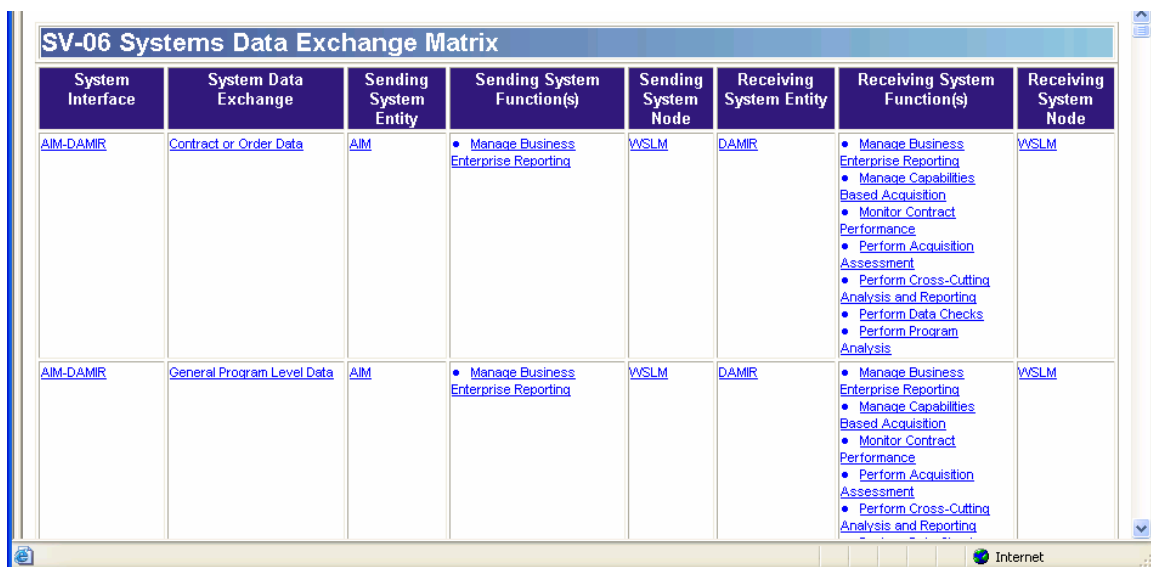
The SV-6 System Data Exchange Matrix is the product which provides details about the Data Elements exchanged between systems and the characteristics of that exchange for the BEA. The SV-6 is used to show the system data exchanges on a system interface. The SV-6 relates to, and is derived from, the OV-3 and SV-1. The operational characteristics in the OV-3 Information Exchange matrix are used to develop the corresponding SDE attributes in the SV-6. Each SDE exchanged is related to the System Entity from the SV-1 that produces or consumes information.

The SV-6 discloses details about system interfaces for each CBM within their BMA. For each SDE, the source and destination System Entities, source and destination Systems Functions, and the sending and receiving System Nodes are provided. The BMA may use this information to ensure that the information on the SV-6 matches business requirements.

#### 13.1.2 Product Structure

The SV-6 product is a matrix report. For the BEA it is generated through the SA reporting tool. It provides the information in tabular form for each SDE linked to System Interfaces in the SV-1. It comprises the System Interface, System Data Exchange, System Entity, System Function and System Node. Figure 13-1 represents a sample SV-6 Systems Data Exchange Matrix.

Figure 13-1, Example of an SV-6 Data Exchange Matrix



System Interface	System Data Exchange	Sending System Entity	Sending System Function(s)	Sending System Node	Receiving System Entity	Receiving System Function(s)	Receiving System Node
<a href="#">AIM-DAMIR</a>	<a href="#">Contract or Order Data</a>	<a href="#">AIM</a>	<ul style="list-style-type: none"><li>• <a href="#">Manage Business Enterprise Reporting</a></li></ul>	<a href="#">WSLM</a>	<a href="#">DAMIR</a>	<ul style="list-style-type: none"><li>• <a href="#">Manage Business Enterprise Reporting</a></li><li>• <a href="#">Manage Capabilities Based Acquisition</a></li><li>• <a href="#">Monitor Contract Performance</a></li><li>• <a href="#">Perform Acquisition Assessment</a></li><li>• <a href="#">Perform Cross-Cutting Analysis and Reporting</a></li><li>• <a href="#">Perform Data Checks</a></li><li>• <a href="#">Perform Program Analysis</a></li></ul>	<a href="#">WSLM</a>
<a href="#">AIM-DAMIR</a>	<a href="#">General Program Level Data</a>	<a href="#">AIM</a>	<ul style="list-style-type: none"><li>• <a href="#">Manage Business Enterprise Reporting</a></li></ul>	<a href="#">WSLM</a>	<a href="#">DAMIR</a>	<ul style="list-style-type: none"><li>• <a href="#">Manage Business Enterprise Reporting</a></li><li>• <a href="#">Manage Capabilities Based Acquisition</a></li><li>• <a href="#">Monitor Contract Performance</a></li><li>• <a href="#">Perform Acquisition Assessment</a></li><li>• <a href="#">Perform Cross-Cutting Analysis and Reporting</a></li></ul>	<a href="#">WSLM</a>



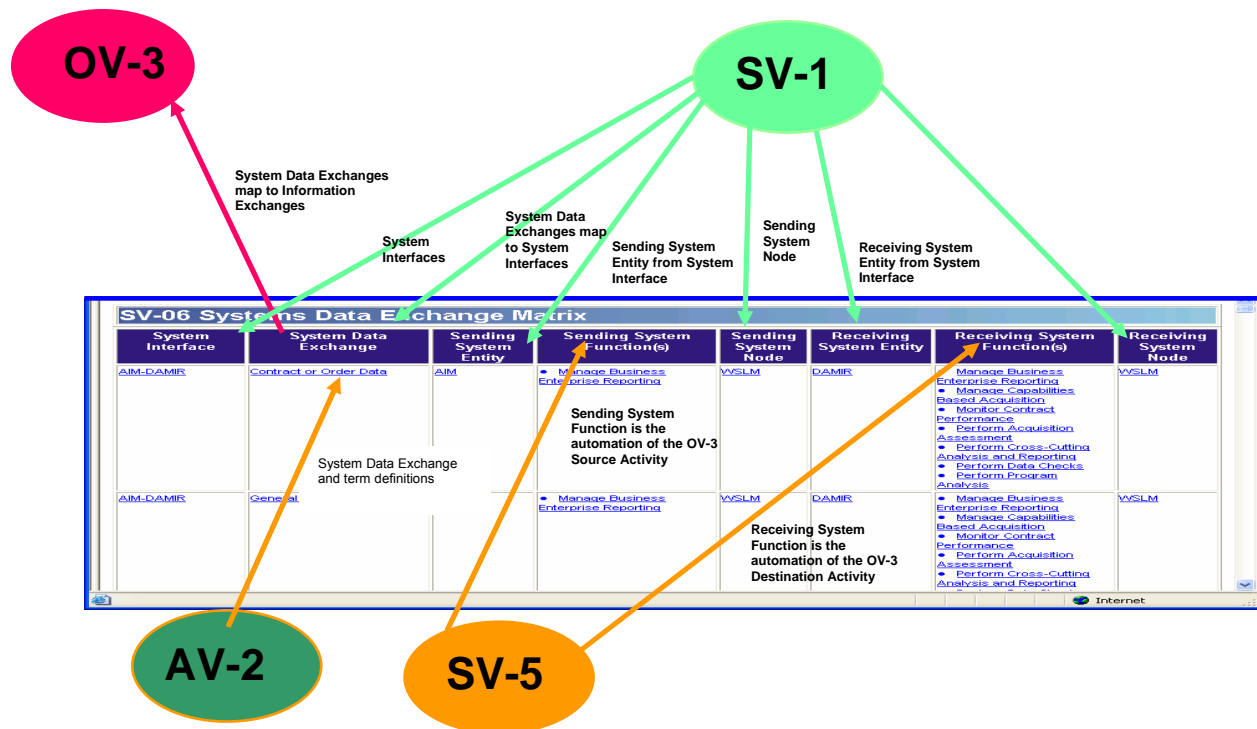
### 13.1.3 Relationship to Other BEA Products

As illustrated in Figure 13-2, the SV-6 is related to other BEA products as follows:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the SV-6 is affected by the release.
<b>AV-2</b>	<p>All SV-6 terms with specific meaning must be defined in the AV-2 Terms Definition list. These terms must include, as a minimum, all object types included in the deliverable. There are no object types used in the SV-6 but rather the SV-6 uses the names of the elements listed in the section above.</p> <p>The SDE definitions must be listed and defined in the AV-2.</p> <p>All acronyms used in the SV-5 descriptions must be listed and spelled out in the AV-2 Acronym Definitions report.</p>
<b>OV-2</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-2 and SV-6.
<b>OV-3</b>	One or more SDEs described in the SV-6 are linked to each IE in the OV-3, showing which SDEs support an IE.
<b>OV-6a</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6a and SV-6.
<b>OV-6c</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-6c and SV-6.
<b>OV-7</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the OV-7 and SV-6.
<b>SV-1</b>	The SV-1 provides the information needed to generate the SV-6 and is shown in Figure 13-2.
<b>SV-5</b>	The SV-5 provides the system function links need to generate the SV-6.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and SV-6.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the FFMIA Guidance Model and SV-6.



Figure 13-2, Relationships Between SV-6 and Other BEA Products



### 13.1.4 SV-6 Product Definitions

The following are definitions of the key elements contained in the Systems Data Exchange Matrix

1. **Sending/Receiving System Node:** A BEA System Node represents one or more systems that work together within a CBM to support the automated portion of the business requirements described in the Operational View.
2. **System Entity:** System Entities represent DoD systems. In the BEA, these systems are identified as being enterprise systems, a FoS or external system. An enterprise system is a system that has been identified as the standard across the DoD. The Systems FoS is a set or arrangement of independent systems that can be arranged or interconnected in various ways to provide different capabilities. An external system represents any system not in the BEA but interfaces with the BEA.
3. **System Interface:** System Interfaces represent the data exchange between System Entities.
4. **Sending/Receiving System Function:** System Functions are the actions the system takes to transform data input into a data output in accordance to the Business Rules. It supports the automated portion of Operational Activities.
5. **System Data Exchange:** System Data Exchanges represent a collection of system Data Elements that System Functions produce or consume. In the BEA implementation of the SV-6, information assurance and performance characteristics of the exchange are not currently provided.

## 13.2 Developing the SV-6

### 13.2.1 Pre-Development Tasks

This section describes the approach to develop, extend and maintain the SV-6. The SV-6 is developed in System Architect as a table by following these steps:

1. Review the BEP's AV-1 and BIP to understand the impact of the planned body of work on the SV-6.
2. Identify outstanding issues from the previous release.
3. The Architecture Development Team meets with Stakeholders to review the issues and develop solutions.
4. After the OV-2, OV-3, OV-5 are stabilized additional issues are identified and reviewed.
5. The Stakeholder requiring a change pre-coordinates the solution with the affected Stakeholders.
6. These tasks three, four and five are repeated in development tasks.

### **13.2.2 Development Tasks**

The development and maintenance of the System Data Exchange Matrix is accomplished in facilitated workshops that include Government SME participation to address content and validate results. The following subsections describe the approach used to develop the SV-6 in the BEA. Each subsection sets forth the specific tasks that must be accomplished in each stage of the development phase. Although most of these steps are sequential, it is common to start some steps before a previous step is completed.

Figure 13-1, shows all the components of the SV-6 report.

#### **13.2.2.1 Creating/Modifying the SV-6 Product**

This section describes the approach to develop the SV-6

##### **13.2.2.1.1 SV-6 Development Approach**

These tasks are completed to create the SV-6 in the BEA.

1. Validate the generated SV-6 against the SV-1 and the OV-3.
2. When the SV-6 is generated, provide copies of the generated matrix to the Stakeholders to review, identify corrections and for acceptance of the product.
3. Meet with Stakeholders to review comments.
4. Perform Impact Analysis to determine impact to OV and SV products.
5. Initiate Change Request process to address identified issues.
6. Upon completion of changes to impacted OV and SV products, regenerate the SV-6 matrix.
  - System Interface
  - System Data Exchange
  - Sending System Entity
  - Sending System Function(s)
  - Sending System Node
  - Receiving System Entity
  - Receiving System Function(s)
  - Receiving System Node

### **13.2.3 Post-Development Tasks**

These tasks are performed after changes to the SV-6 by the Stakeholders to ensure integration of the architecture.

1. Compare information on generated SV-6 to SV-1:

- 1.a. Validate that each System Node in the SV-1 is represented in the SV-6.
- 1.b. Validate System Entities:
  - Ensure that every System Entity in the SV-6 is associated with the correct System Node.
  - Validate that the System Function to System Entity linkage on the SV-6 matches the content of the SV-1.
- 1.c. Validate System Interfaces:
  - Validate that only inter-nodal System Interfaces are in the SV-6 matrix.
  - Validate the sending and receiving System Entities against the content of the SV-1.
  - Ensure that SDEs map to System Interfaces based on the content of the SV-1.
2. Compare information on generated SV-6 to OV-3:
  - 2.a. Validate source and destination System Nodes against source and destination Operational Nodes.
  - 2.b. Validate System Interfaces against Need Lines.
  - 2.c. Validate SDEs against IEs.
  - 2.d. Validate Data Elements against the IEs

## 13.3 Modeling the SV-6 Product Using SA

The SV-6 is an automated report that is generated from the SV-1 and OV-3.

### 13.3.1 SV-6 Modeling Conventions

There is no modeling of the SV-6 within SA. The content for the SV-6 is derived from other SV products

### 13.3.2 Modeling SV-6 Objects

There is no modeling of the SV-6 within SA. The content for the SV-6 is derived from other SV products

### 13.3.3 SV-6 Best Practices

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### 13.3.3.1 SV-6 Lessons Learned

The following lessons learned have been and serve as the basis for the SV-6 in Appendix B:

- Need regular and early communication with across architecture development team to assess impact of changes to the SV-1.
- Ensure that the OV-5 and OV-3 products are stabilized prior to SV-6 development.
- Ensure that the SV-6 is regenerated whenever there is any change to the SV-1 product. The products are directly linked so a change in the SV-1 will result in a change to the SV-6.
- Stakeholders should thoroughly review System Data Exchanges and Attributes for each System Interface to ensure they are properly aligned to the Operational View products.
- Ensure that all exception reports have been reviewed and resolved.

#### 13.3.3.2 SV-6 Common Pitfalls

The following example is a common mistake that could affect the development lessons learned have been and also serves as the basis for the SV-6 Checklist on Appendix B:

- As the SV-6 exists only as a large HTML report that is generated by the build team, flaws are only exposed in the Web version of the architecture, which may not be fully reviewed until after BEA product stabilization efforts.

## 14 TV-1 –Technical Standards Profile

### 14.1 Summary Description

This section describes the Technical Standards Profile, its relationship to other BEA products, the development method, and the modeling guidelines to be followed.

#### 14.1.1 Product Purpose

The purpose of the BEA TV-1 is to describe the mandated Information Technology (IT) standards that a BEA-compliant system must implement, as needed, to provide interoperability and net-centric services across the DoD Enterprise. The fundamental requirement driving the content of the TV-1 is the mandate for compliance with the DoD IT Standards Repository (DISR). In general, the Technical Standards Profile (TV-1) provides the minimal set of rules, standards, and protocols governing the arrangement, interaction, and interdependence of system parts or elements. In addition to a collection of the technical standards, the TV may include implementation conventions, standards options, rules, and criteria organized into profile(s) that govern systems and system elements for a given Architecture. When the standards profile is tied to system elements through services, the TV-1 serves as the bridge between the SV and TV (see Figure 14-1).

The TV-1 is a listing of standards that must be followed when implementing a given architecture. This will ensure the implementation will provide the system capabilities identified in the Systems Views (SV) that are required to meet the operational needs defined by the architecture's Operational Views and its specific concept of operations.

#### 14.1.2 Product Structure

The TV-1 is a tabular product. It comprises a Technology Service Area, Technical Services, Standards, and Standard Description as outlined in the following sections.

The TV-1 is aligned with the SV-1, SV-5 and SV-6 Systems Views. In the architecture, the selected standards are related to the Systems in the SV-1. In support of the architecture implementer or system designer, each standard listed in the profile is associated with the SV elements that implement or use that standard.

The TV-1 Technical Standards Profile is in a table matrix format. The hierarchical structure of the TV-1 consists of a three-tier set of categories: Technology Service Areas, which contain Technical Services that conform to Standards. Such a structure makes it easier for architecture implementers and system designers to locate the standards that apply. The structure adopted for the BEA TV-1 is that defined by the Core Architecture Data Model for DoDAF-compliant architecture.

The categories used to represent the TV-1 product are numbered as shown in Figure 14-1, Example of the BEA TV-1 Matrix.

Figure 14-1, Example of the BEA TV-1 Matrix

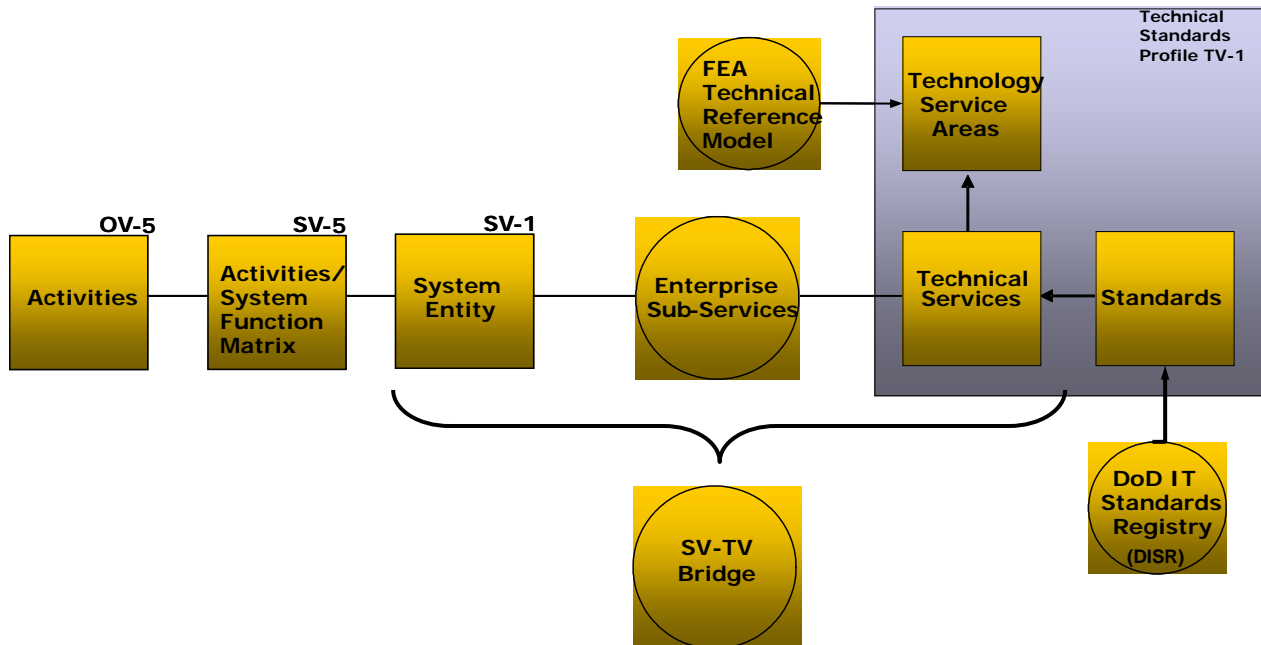
Technology Service Area	Technical Services	Standards	Standard Description
Component Framework <sup>1</sup>	Access Control <sup>2</sup>	FIPS Pub 140-2 <sup>3</sup>	Security Requirements for Cryptographic Modules May 25, 2001. <sup>4</sup>
Component Framework	Information Assurance	SDN.801	Access Control Concept and Mechanisms, Revision C, May 12, 1999.
Service Access and Delivery	Collaboration	ISO/IEC 11171-2	Coding of moving pictures and associated audio for digital storage media at up to about 1.5 Mbit/s - Part 2 Video, 1993.

## Relationship to Other BEA Products

Figure 14-2, the TV-1 is related to other BEA products as follows:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the TV-1 is affected in the release.
<b>AV-2</b>	<p>All TV-1 terms with specific meaning must be defined in the AV-2 Terms. These terms must include, as a minimum, all object types included in the deliverable.</p> <p>These TV-1 deliverable objects must be listed and defined in the AV-2:</p> <ul style="list-style-type: none"> <li>• Standard Definitions</li> <li>• Technical Service Definitions</li> <li>• Technology Service Area Definitions</li> </ul> <p>All acronyms used in the TV-1 descriptions must be listed and spelled out in the AV-2 Acronyms.</p>
<b>OV-2</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and the OV-2
<b>OV-3</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and the OV-3.
<b>OV-5</b>	Technical Standards in the TV-1 are selected based on operational requirements derived from the business operations defined by the OV-5. However, the TV-1 dictates the function modeling notation used to develop the OV-5.
<b>OV-6a</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and the OV-6a
<b>OV-6c</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and the OV-6c. However, the TV-1 dictates the business process modeling notation used to develop the OV-6c.
<b>OV-7</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and the OV-7. However, the TV-1 dictates the data modeling notation used to develop the OV-7.
<b>SV-1</b>	Through Technical Services in the TV-1, standards govern the arrangement, interaction, and interdependence of systems (parts and/or elements) represented as System Entities in the SV-1.
<b>SV-5</b>	The System Entity in the SV-1 uses System Functions in the SV-5 to describe its system capabilities. This establishes a relationship to the TV-1. In addition, the OV-5 activity represented in the SV-5 provides further linkage.
<b>SV-6</b>	The System Entity in the SV-1 is represented as a sending or receiving system data (a system element) in the SV-6. This establishes a relationship to the TV-1.
<b>DFMIR/ FFMIA Guidance Model</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the TV-1 and DFMIR/FFMIA Guidance.

Figure 14-2, Relationships between TV-1 and Other BEA Products



### 14.1.3 TV-1 Product Definitions

The tabulated columns of this matrix, as illustrated in Figure 14-1, Example of the BEA TV-1 Matrix, represent the following:

#### Technology Service Area (1)

Technology Service Areas group similar Technical Services together for increased organization and comprehension. There may be one or more Technical Services in a Technology Service Area. The current TV-1 takes its highest-level structure from the DoD Enterprise Architecture (EA) Technical Reference Model (TRM). It contains four Technology Service Areas, drawn from the Core Service Areas of the DoD EA TRM. This provides a high degree of traceability between the two documents and makes optimal use of the DoD EA TRM as the interface between the BEA and the FEA Consolidated Reference Model (CRM), to which DoD programs must map for Office of Management and Budget (OMB) Exhibit 300 purposes.

The current BEA Technology Service Areas are:

- **Component Framework:** The underlying foundation, technologies, standards and specifications by which system capabilities are built, exchanged and deployed across the BMA.
- **Service Access and Delivery:** The collection of standards and specifications that support external access, exchange and delivery of a system capability.
- **Service Interface and Integration:** The collection of technologies, standards and specifications that govern the interface with a system capability.
- **Service Platform and Infrastructure:** The collection of delivery and support platforms, infrastructure capabilities and hardware requirements to support the construction, maintenance and availability of a system capability.

#### Technical Services (2)

In the TV-1 model a Technical Service, with its constituent standards, is a technical capability designed to support a Net Centricity. Technical Services are assigned to each Technology Service Area within the BEA TV-1 to

support the development of BEA-compliant systems. There may be one or more Technical Services in any given Technology Service Area.

**Note:** Enterprise Sub-Services

A fundamental component of the BEA framework is the Enterprise-wide infrastructure that will provide the foundation for all relevant business services. Whereas much of the framework development centers on the operational business aspects of the architecture, there are several areas that focus on those components that support the business processes, but are not directly related to the business requirements. They describe the intersection between the business processes and Technical Services, and define standard attributes to bring order to that point. The BEA refers to these components as Enterprise Sub-Services. Each identified Enterprise Sub-Services can be linked to the specific Technical Services that will implement the Enterprise Sub-Service. Enterprise Sub-services are directly related to System Entities that are represented on the TV-1. There may be more than one Enterprise Sub-service that supports a System Entity. Enterprise sub-services support the linkage of a SV-TV Bridge.

**Standards (3)**

This is the standard identifier, found in the DISR, determined and designated by the applicable Standards Development Organization (SDO). It is represented as the Standard name in the BEA. One or more Standards support a given Technical Service.

**Standard Description (4)**

This is the official title of the standard determined by the applicable SDO and is represented as the standard description in the BEA. The standard description represents an agreed upon means to implement all or part of a Technical Service in the BEA. The DISR is the origin of all Standards in the BEA TV-1, and appropriate references to the DISR and to additional information about the Standards is provided for each Standard. As content of the DISR changes over time, the BEA TV-1 updates will reflect the relevant changes in the Standards.

Since a fundamental requirement driving the content of the TV-1 is the mandate for compliance with the DISR, all updates to DISR are analyzed for applicability to the business mission and those resulting updated Standards are included into the BEA Technical Standards Profile. Mandated Standards are essential for providing interoperability and net-centric services across the DoD Enterprise. These are current and established Standards that are required as the “must comply” Standards that implement the Technical Services without deviation. Mandated Standards usually are widely adopted and mature technologies. Compliance with the DISR is mandated for all new DoD information systems to support interoperability and net-centricity across the DoD Enterprise. To accommodate this requirement, all the BEA TV-1 Standards are adopted from Standards in the latest version of the DISR.

## 14.2 Developing the TV-1 Products

This section describes the approach to develop, extend and maintain the TV-1. The TV-1 is developed in MS Excel and HTML as a table.

Development of the TV-1 starts with collecting information relevant to the standards contained in the BEA and ensuring the most up-to-date DISR release is being used. Technical Services are then developed that may be used by the specific enterprise systems listed in the Operational Activity to Systems Functionality Traceability Matrix (SV-5). Individual IT Standards that are required to implement each identified Technical Service are from the DISR and associated with the Technical Service. Identified Technical Services that do not have Standards associated with them are not included in the final TV-1. The TV-1 identifies the source documents used for each Standard it identifies. The TV-1 also includes any relevant IA Standards listed in the latest DISR baseline.

Throughout the development of the BEA TV products, analysts and engineers make a number of decisions that affect the content of each new product release. These decisions occur periodically during the TV development process, a process comprised of five high order procedures. The Engineering Decisions made during these procedures, and their impact upon the BEA Technical Standards View products, is as follows:



## 14.2.1 Pre-Development Tasks

The tasks that must be completed prior to TV-1 development and/or maintenance are:

1. Review the BEP's AV-1 and BIP to understand the impact of the planned body of work on the TV-1 Technical Standards Profile.
2. Identify products that could potentially be affected by changes to the TV-1 and begin coordination within the Architecture Development Team.
3. Collect Information through Subject Matter Expert interviews.
  - Conduct periodic interviews with industry and DoD technology authorities. This decision is derived from the project plan; however, specific implementation is subject to the team consensus regarding areas of technology that should be addressed first. Therefore, areas such as security or web services may hold an apparently arbitrary advantage over technologies such as Extensible Markup Language (XML) based upon the Engineering Decision of the TV analyst.
  - Participate in DISR Information Technology Standards Working Groups (ISWGs). This provides a forum for discussing the Standards with representatives from various DoD organizations who have the proper technical, functional and acquisition expertise from their organizations. The ISWGs are responsible for making recommendations for updating the DISR. The technology areas provide the primary body for identifying the lifecycle stage of each Standard and profile contained in the DISR. The ISWGs are responsible for making recommendations for updating the DISR.
4. Coordinate internal TV-1 Development Cycle with DISR release schedule.
  - Refer to DISR online to get specific instructions for activities associated with the DISR release schedule.
  - The TV-1 must be developed using the latest DISR updated baseline, which happens three times a year. This insures that all standards within the BEA are accurate and up-to-date.

## 14.2.2 Development Tasks

The development and maintenance of the Technical Standards Profile is accomplished in facilitated workshops that include Government SME participation to address content and validate results. The following subsections describe the approach used to develop the TV-1 for the BEA. Each subsection sets forth the specific tasks that must be accomplished to in each stage of the development phase. Although most of these steps are sequential, it is common to start some steps before a previous step is completed.

### 14.2.2.1 Creating/Modifying the TV-1 Products

This section describes the approach to develop the TV-1.

1. Identify and Define Technical Services and Standards Data
  - The widest possible array of authoritative sources is consulted for guidance and cross reference of Standards, either mandated or emerging, within DoD and its services. Ongoing business and technical analysis of mandated Standards in the DISR determines relevance to the BEA TV-1. Standards that do not directly apply to business systems (such as Standards for routing protocols, backplane buses and weapons systems) in the business domains are outside the scope of the BEA TV-1.
2. Organize Information into a Local Data Repository
  - Use System Architect v10 (and updates) as the Data Repository and schema for standards-related data to facilitate the integration of data between Operational View (OV), SV and TV products.

- Use Microsoft Excel as the working repository of Technical Services-related data. The use of Excel decreases the requirement for additional operator training on the System Architect product. It increases the flexibility with which multiple analysts can interact with the data repository. Excel increases the ease with which draft versions of the repository are shared with other members of the BEA development team. It also alleviates the limitations placed upon users who need access to work with the data repository (licenses, learning curve and level of effort). Excel increases the team's ability to perform analytical reviews of the data repository using Excel's data analysis capabilities.
3. Conduct Data Analysis to Target BEA Requirements
    - Tailor the collection of Technical Services to meet BEA requirements. The repository of Technical Services changes as needed by Engineering Decision to eliminate Technical Services that are outside the area of direct interest to BEA and include new Technical Services when appropriate. For example, to better align with the newly emerging DISR Standards organization schema, the Application, Collaboration, Discovery, Enterprise Service Management (ESM), Information Assurance and Security (IAS), Infrastructure Transport, Mediation, Messaging, Storage, and User Assistance, Logistics and Human Resources enterprise services may be treated as BEA Technical Services.
  4. Produce the TV-1
    - Load the System Architect Data Repository immediately prior to product delivery. The latest available version of data available through Systems Architect is the version last delivered as a finished product.
    - Customize the System Architect Technical Standards View reports, and generate the TV-1 and associated reports. The predefined Technical Standards View reports were found to be inadequate to the needs of the BEA. Customized reports are created to show the TV-1 and the linkage to the System View products.

### 14.2.3 Post-Development Tasks

These tasks are performed after changes to the TV-1 by the Stakeholders to ensure integration of the architecture:

1. Hold Integration workshop
2. Obtain feedback and make modifications
3. Obtain approval from the Stakeholders

## 14.3 Modeling the TV-1 Products Using SA

### 14.3.1 TV-1 Modeling Conventions

This section does not apply to the TV-1.

### 14.3.2 Modeling TV-1 Objects

This section does not apply to the TV-1.

### 14.3.3 TV-1 Best Practices

This section discusses best practices, including lessons learned during previous BEA development cycles pertaining to the development of the TV-1 and common pitfalls to avoid while updating the product.

#### 14.3.3.1 TV-1 Lessons Learned

The following lessons learned have been and serve as the basis for the TV-1 on Appendix B:

- The SV-1, SV-5 and SV-6 products must be stabilized.

- Technical Standards must be grouped into meaningful Technical Services to ensure that only the appropriate Standards are mapped to enterprise systems.
- Ensure that all exception reports have been reviewed and resolved.

#### **14.3.3.2 TV-1 Common Pitfalls**

The following are common mistakes encountered in the development of the TV-1 that have been identified and may also serve as the basis for the TV-1 Checklist on Appendix B:

- Excluding acronyms in the AV-2.
- Grouping too many Standards into too few Technical Services.
- Not using the most recent DISR baseline release

# 15 DFMIR/FFMIA Guidance Model

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## 15.1 Summary Description

This section describes the DFMIR/FFMIA Guidance Model architecture product, its relationship to other BEA products, the model-development method and the modeling guidelines used for development of the DFMIR/FFMIA Guidance Model.

The Federal Financial Management Improvement Act (FFMIA) is a public law that requires each Federal agency to implement and maintain financial management systems that comply with applicable accounting standards and systems requirements. The Defense Financial Management Improvement Rules (DFMIR) are system and operational rules which substantially improve the timeliness, reliability, and accuracy of financial information across DoD and contribute towards the Department's objectives of achieving audit readiness and delivering interoperable financial management systems. DFMIR/FFMIA Guidance statements may or may not be compliance artifacts based on an indicator and type described in subsequent sub-sections.

### 15.1.1 Product Purpose

The BEA distinguishes between a Business Policy/Guidance and Business Rules.<sup>10</sup> The distinctions are based on the definitions of a Business Policy/Guidance and Business Rules as derived from Object Management Group's *Semantics of Business Vocabulary and Business Rules v1.0* and *DoDAF 1.5*. The primary differences between Business Policy/Guidance and Business Rules are that Business Policy/Guidance can be:

- Less structured
- Less discrete or not atomic
- Less carefully expressed in terms of a standard vocabulary
- Not directly enforceable

The DFMIR/FFMIA Guidance Model is the set of statements that constrain an Enterprise, mission, operation, business, or architecture, but the statements do not conform to the BEA Business Rule standards. The BEA Operational Rules and System Rules follow the BEA standards and are atomic, unambiguous and written using a standard notation. DFMIR/FFMIA Guidance statements may not be atomic, may not be unambiguous, and may not be written in a standard notation. DFMIR/FFMIA Guidance statements are entered into the BEA to fulfill the DoD business mission of describing what the business can and cannot do.

In the future, DFMIR/FFMIA Guidance statements may be rewritten to comply with the BEA APG Business Rule standards and then migrated to become BEA OV-6a Operational Rules or SV-10a System Rules. Additionally, the rewriting of the DFMIR/FFMIA Guidance statements may update the AV-2 Acronyms and Terms.

### 15.1.2 Product Structure

The DFMIR/FFMIA Guidance product is depicted in a textual matrix format with no diagrams. It is manually created and an unlimited number of DFMIR/FFMIA Guidance statements can be stored within the BEA System Architect encyclopedia.

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<sup>10</sup> These are also distinct from Laws, Regulations and Policies (LRP).

### 15.1.3 Relationship to Other BEA Products

DFMIR/FFMIA Guidance is related to other BEA products through the following:

<b>AV-1</b>	The scope of the development effort for each BEP for a development cycle, as disclosed in the AV-1, will determine if the TV-1 is affected in the release.
<b>AV-2</b>	DFMIR/FFMIA Guidance terms with specific meaning and acronyms may be defined in the AV-2 Terms; however, it is not a requirement.
<b>OV-2</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the OV-2.
<b>OV-3</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the OV-3.
<b>OV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the OV-5.
<b>OV-6a</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the OV-6a.
<b>OV-6c</b>	DFMIR/FFMIA Guidance statements must be mapped to at least one BPM Processes in the OV-6c Business Process Diagrams.
<b>OV-7</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the OV-7.
<b>SV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the SV-1.
<b>SV-5</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the SV-5.
<b>TV-1</b>	Although all BEA products are related through integration of the architecture, no direct relationship exists between the DFMIR/FFMIA Guidance and the TV-1.

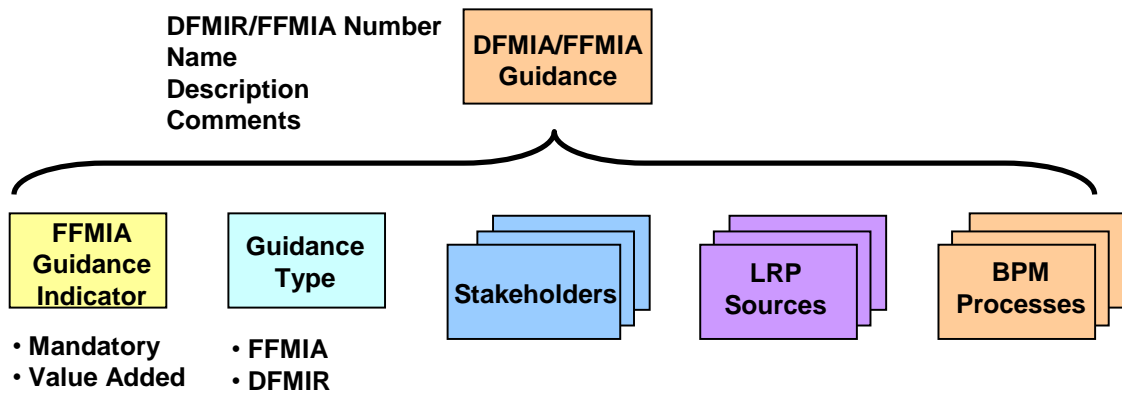
### 15.1.4 DFMIR/FFMIA Guidance Model Definitions

#### 15.1.4.1 DFMIR/FFMIA Field Definition

This section defines concepts and terms often used when discussing DFMIR/FFMIA Guidance statements. The DFMIR/FFMIA Guidance Model is not a DoDAF product. However, DFMIR/FFMIA Guidance statements can be used as specific compliance artifacts.

Figure 15-1, Data Fields and Structure of a DFMIR/FFMIA Guidance Statement, illustrates the nine (9) data fields and structure of a DFMIR/FFMIA Guidance statement. Four data fields are text entry. Three of the data fields can have multiple data values.

Figure 15-1, Data Fields and Structure of a DFMIR/FFMIA Guidance Statement



1. **DFMIR/FFMIA Number:** A mandatory data field that is a unique number given to a DFMIR/FFMIA Guidance statement for identification purposes. The unique number is manually assigned. The following are examples of correct DFMIR/FFMIA Guidance Numbers:
  - 6001579
  - 6001580

The DFMIR/FFMIA Number should be assigned sequentially within the BEA Release number as shown above. That is, the BEA Release is “6.0” and the sequential numbers are “1579” and “1580”. This assignment technique allows all of the new DFMIR/FFMIA Guidance Statements for a BEA Release to be easily identified.

2. **Name:** A mandatory data field that is a unique name given to a DFMIR/FFMIA Guidance for user identification purposes. The DFMIR/FFMIA Guidance Name is limited to 80 characters and contains an underscore between each of its parts. Each part can be either alphabetic or numeric. The DFMIR/FFMIA Guidance Name must begin with an alphabetic part. Each alphabetic part must start with an uppercase letter followed by lowercase letters unless the term is a capitalized acronym. The DFMIR/FFMIA Guidance Name is used to map to other architecture artifacts such as a BPM Process. The following are examples of correct DFMIR/FFMIA Guidance Names:
  - Access\_To\_Online\_Training
  - Accounting\_For\_Federally\_Owned\_PPE
  - Budget\_Sub\_Activity\_Identifier\_Association\_1
3. **Description:** A mandatory data field that contains the actual DFMIR/FFMIA Guidance statement. It is a statement of constraint or permission. Each DFMIR/FFMIA Guidance Description must be unique. In other words, there must not be any duplicate DFMIR/FFMIA Guidance Descriptions in a BEA release. The following is an example of a correct DFMIR/FFMIA Guidance Description:

An appropriation must be recognized as revenue when it is used for goods and services received.

4. **FFMIA Guidance Indicator:** A mandatory data field that must be either “Mandatory” or “Value Added”. DFMIR/FFMIA Guidance statements that are denoted as “Mandatory” are compliance artifacts.
5. **Guidance Type:** A mandatory data field that must be either “FFMIA” or “DFMIR” depending on the source of the statement.
6. **Comments:** An optional data field for use by the Stakeholder(s).

7. **LRP Sources:** An optional multiple valued data field that contains a link to the specific Law, Regulation or Policy in the LRP Database. The LRP Sources are selected from a list of available LRP Sources.
8. **Stakeholders:** A mandatory data field that can have multiple values that assigns a DFMIR/FFMIA Guidance statement to one or more owners. The Stakeholders field must contain at least one BEP or CBM designation. The selections are made from a drop down list.
9. **BPM Processes:** A mandatory multiple valued data field that contains the name or names of BPM Processes. Each DFMIR/FFMIA Guidance statement must be linked to at least one BPM Process. The BPM Process artifacts are selected from the list of BPM Processes.

#### 15.1.4.2 LRP Source Definition

This section discusses the update to the LRP Source Definition that is performed after the DFMIR/FFMIA Definitions have been loaded. The reason for this is that a new LRP Source Definition is automatically created during the DFMIR/FFMIA Definition load when that LRP Source does not already exist. The Name data field of the LRP Source Definition is the identifier of a LRP Source Definition. This value is used to subsequently load the corresponding LRP Source Definition data fields for a DFMIR/FFMIA Guidance Statement Definition.

The four text data fields required for LRP source definition are described below:

1. **Name:** A mandatory data field that is a valid LRP Source Identifier to the specific Law, Regulation or Policy in the LRP Database. The value must be the same as the value loaded into the corresponding DFMIR/FFMIA Guidance Statement Definition.
2. **Description:** A mandatory data field that contains the description of the LRP item stored in the LRP database. The value of the data field is provided by the Stakeholder.
3. **Primary Reference:** A mandatory data field that is the cited source of the description in the LRP database. The value of the data field is provided by the Stakeholder.
4. **Link:** A mandatory data field that is the same as the value stored in the Name data field.

#### 15.1.4.3 DFMIR/FFMIA Guidance Input Field Capture

This section describes capturing the DFMIR/FFMIA Guidance field values for inserts or changes to the System Architect encyclopedia.

##### 15.1.4.3.1 Input Document

The primary input document is a spread sheet that has the following four tabs:

1. Main Load
2. LRP Sources
3. Stakeholders
4. BPM Processes

The Main Load tab contains all of the above single entry fields as columns. That is, the data fields for which there is only one value; such as the DFMIR/FFMIA Guidance Description.

The other three tabs contain the fields for which multiple occurrences are possible; for example, a DFMIR/FFMIA Guidance statement can be mapped to more than one Process. The map between the DFMIR/FFMIA Guidance statement and the other BEA artifacts is the DFMIR/FFMIA Guidance Name. The following is an example of entries in the BPM Process tab.

BPM Process Name	DFMIR/FFMIA Guidance Name
Manage Financial Management Policy	Audit_Trails_9
Manage Financial Reporting	Deferred _Maintenance_And_Cleanup_Costs_1
Manage Financial Management Policy	Deferred _Maintenance_And_Cleanup_Costs_1



The LRP Sources and the Stakeholders tabs have the same construct as the above.

This input document is also used as a “turn around” document for reviews between the Business Rules Team and the Stakeholders.

#### **15.1.4.3.2 System Architect Update Process**

There are two basic System Architect update processes; one for a large update volume and the other for a small update volume.

A large update volume requires assistance from the System Architect Build Team. The System Architect Build Team uses the spread sheet as input to an automated procedure.

A small update volume is manually entered into System Architect by the Business Rule Team.

#### **15.1.4.3.3 Mapped Field Validation**

The mapped field names must be correct, otherwise errors will be generated and the DFMIR/FFMIA Guidance will not be complete. The System Architect Build Team automated load procedure automatically inserts artifacts when a match is not found. For example, an incorrect BPM Process name will cause a new BPM Process to be added with that name. This is an error that must be manually corrected. Consequently, care must be taken to assure that the mapped names are valid and already exist in System Architect.

## **15.2 Developing the DFMIR/FFMIA Guidance Model**

This section describes the approach used by the Business Rules Team to develop the DFMIR/FFMIA Guidance model. The Business Rules Team works with Stakeholders’ functional SMEs to produce DFMIR/FFMIA Guidance statements that support the business transformation. The DFMIR/FFMIA Guidance Process includes development, maintenance, and retirement of DFMIR/FFMIA Guidance statements.

### **15.2.1 Pre-Development Tasks**

Pre-development work may include suggesting general guidance on how to develop content, answering any form and structure questions, or generating and analyzing System Architect reports from the prior BEA release. This process for DFMIR/FFMIA Guidance creation does not require detailed analysis of the architecture. The Stakeholders provide the Business Rules Team with their identified DFMIR/FFMIA Guidance statements mapped to BPM Processes for pre-analysis.

### **15.2.2 Development Tasks**

The BEA development schedule must allot time for DFMIR/FFMIA Guidance development tasks. This period of time is referred to as the DFMIR/FFMIA Guidance workshop, but these tasks are performed outside of a formal workshop setting.

#### **15.2.2.1 Refine DFMIR/FFMIA Guidance Statement**

The Stakeholders identifies the DFMIR/FFMIA Guidance statements, its BPM Process mapping, and the LRP Source Identifier(s), if applicable, during the Pre-Development Task. The Stakeholders determine whether the DFMIR/FFMIA Guidance statement already exists in the BEA.

The DFMIR/FFMIA Guidance Indicator data value is determined by the Stakeholders. For DFMIR/FFMIA Guidance statements, each statement must have an indicator of “Mandatory” or “Value Added”. The indicator is used while assessing DFMIR/FFMIA compliance.

#### **15.2.2.2 DFMIR/FFMIA Guidance Model Coordination with Stakeholders**

After the Business Rules Team completes the technical review with the Business Rules Team Lead, a DFMIR/FFMIA Guidance statement may be passed back to the Stakeholders for a functional review. The



Stakeholders verify the proposed DFMIR/FFMIA Guidance statement. If the proposed DFMIR/FFMIA Guidance statement passes the functional review, the Stakeholders return it to the Business Rules Team for pre-load verification. The Business Rules Team can not change the content of the DFMIR/FFMIA Guidance statement; however, spelling and minor format discrepancies can be denoted for change.

### 15.2.2.3 DFMIR/FFMIA Guidance Load Preparation

After the Stakeholders and the Business Rules Team agree upon the validity of the DFMIR/FFMIA Guidance statements, the DFMIR/FFMIA Guidance statements are ready for the Business Rules Team to load them into the BEA. The Business Rules Team uses the load sheet, which is an MS Excel spreadsheet that lists the DFMIR/FFMIA Guidance statements and all associated fields discussed in 15.1.4 Definitions. This load sheet is submitted to the Stakeholders for approval through the designated End-to-End Process Workshops. Once the Stakeholders grant final approval, the Business Rules Team submits the load sheet and a copy of the approved CR to the System Architect Build Team.

The Business Rules Team can manually input the approved DFMIR/FFMIA Guidance statements into System Architect. This approach is normally used when the DFMIR/FFMIA Guidance statement volume is less than twenty (20).

Once the DFMIR/FFMIA Guidance statements are in System Architect, the Business Rules Team verifies that the load sheet is correctly represented in the BEA. This step must wait for the System Architect Build Team to perform an Encyclopedia update so that the Business Rules Team can conduct the Post-Build Verification on the latest Encyclopedia build. Typically, this verification is performed using the SA Report Generation to create a report that includes all of the loaded data fields. If the Business Rules Team discovers a discrepancy at this point, he or she works with the System Architect Build Team to correct it.

### 15.2.2.4 Creating/Modifying the DFMIR/FFMIA Guidance Model

To ensure that the DFMIR/FFMIA Guidance statements remain valid, the Business Rules Team follows a maintenance and retirement process. The Stakeholders notify the Business Rules Team that there is a change in the BEA affecting existing DFMIR/FFMIA Guidance statements. The Business Rules Team identifies the DFMIR/FFMIA Guidance statements and makes any necessary adjustments in System Architect. Next, the Business Rules Team analyzes the architecture for potential changes to the existing processes and other linkages in System Architect. Finally, the Business Rules Team validates the above process for continued support of the business transformation. The following discusses the maintenance process in detail:

#### 15.2.2.4.1 Identify DFMIR/FFMIA Guidance Statements

Either the Stakeholders or Business Rules Team may initiate an analysis to determine if changes are needed. A number of circumstances may trigger a change to some aspect of the DFMIR/FFMIA Guidance statement and/or its artifacts. Below are typical (but not an inclusive list of) triggers:

- Business Objective change
- Process Step change
- Requirement change
- Laws, Regulations and Policies (LRP) Source change

**Note:** If a LRP unique Identifier or description already mapped to a DFMIR/FFMIA Guidance statement changes in the LRP Repository (DOORS database), the LRP team will notify the Business Rules Team and/or the Stakeholders. The Business Rules Team will manage the change in System Architect.

#### 15.2.2.4.2 Analyze Potential Changes

Once the change is identified, the Business Rules Team conducts analysis to determine any potential impacts on the BEA. The analysis includes impact to other architectural products, existing DFMIR/FFMIA Guidance statements, Business Rules and/or requirements.

#### 15.2.2.4.3 Validate DFMIR/FFMIA Guidance Changes

The Business Rules Team hands off the DFMIR/FFMIA Guidance statement for technical review to the Business Rules Team Lead. After completing technical review, the Business Rules Team works with the appropriate Stakeholder for functional approval.

#### 15.2.2.4.4 Update System Architect

Upon approval, the Business Rules Team makes the changes in System Architect or creates a load sheet to present to the Build Team for automated loading.

### 15.2.3 Post-Development Tasks

As with the DFMIR/FFMIA Guidance maintenance process, a number of events may trigger the retirement process, such as:

- A Business Objective change or elimination
- BPM Process modification or elimination
- LRP Source change or elimination

The Stakeholders notify the Business Rules Team that a DFMIR/FFMIA Guidance statement needs to be retired. The Business Rules Team, working closely with the Stakeholders, documents the reason for retirement, and then the DFMIR/FFMIA Guidance statement is retired from the System Architect encyclopedia. Finally, the appropriate validation steps are executed to ensure that the DFMIR/FFMIA Guidance statement was actually retired.

**Note:** The Stakeholders review each DFMIR/FFMIA Guidance statement identified for retirement, verifying whether it is appropriate to retire the DFMIR/FFMIA Guidance statement for all Processes. If a DFMIR/FFMIA Guidance statement, identified for retirement, still has a valid mapping to another Process Step, the Business Rules Team retains the DFMIR/FFMIA Guidance statement, removing only the link to the retired Process Step.

The following discusses the retirement process in more detail:

#### 15.2.3.1 Identify Obsolete DFMIR/FFMIA Guidance Statement

The Stakeholders are responsible for identifying a DFMIR/FFMIA Guidance statement that needs to be retired. In addition, if an architecture object deletion or change is the trigger, the Stakeholders identify whether each instance of the DFMIR/FFMIA Guidance statement must be deleted or just the mapping between the DFMIR/FFMIA Guidance statement and the architecture object being changed.

#### 15.2.3.2 Retire DFMIR/FFMIA Guidance Statement

The Business Rules Team removes the identified DFMIR/FFMIA Guidance statement from System Architect. The Business Rules Team also identifies to the LRP team a retired DFMIR/FFMIA Guidance statement that has a LRP Identifier associated with it. If the DFMIR/FFMIA Guidance statement is still valid, and possesses valid mappings to other architecture objects, the Business Rules Team removes only the prescribed mapping.

#### 15.2.3.3 Validate DFMIR/FFMIA Guidance Statement Retirement

The Business Rules Team conducts the appropriate quality assurance checks. These checks validate the appropriate retirement of a DFMIR/FFMIA Guidance statement and prevent the creation of orphan process and data artifacts.

## 15.3 Modeling DFMIR/FFMIA Guidance Using SA

### 15.3.1 DFMIR/FFMIA Guidance Modeling Conventions

Guidelines that assist in the identification and definition of DFMIR/FFMIA Guidance statement are:

- Each DFMIR/FFMIA Guidance statement must have a unique DFMIR/FFMIA Guidance Name. The DFMIR/FFMIA Guidance statement Name format is described in Subsection 15.1.4 of this document.
- Each DFMIR/FFMIA Guidance statement must be assigned a unique DFMIR/FFMIA Number by which it can be identified.
- Each DFMIR/FFMIA Guidance statement must have a unique description. The Description is the actual DFMIR/FFMIA Guidance statement. Subsection 15.3.1 of this document provides details on the construction of DFMIR/FFMIA Guidance statements.
- Each DFMIR/FFMIA Guidance statement must have at least one Stakeholder. The Stakeholder may be an individual BEP designation or a CBM designation.
- Each DFMIR/FFMIA Guidance statement must have a FFMIA Guidance Indicator of either “Mandatory” or “Value Added”.
- Each DFMIR/FFMIA Guidance statement must have a Guidance Type of “FFMIA” or “DFMIR”.

### **15.3.2 DFMIR/FFMIA Guidance Best Practices**

This section discusses best practices, including lessons learned from previous architecture development efforts and common modeling pitfalls to avoid.

#### **15.3.2.1 DFMIR/FFMIA Guidance Model Lessons Learned**

- A clear understanding of the OV-6c Business Process Diagrams must come before DFMIR/FFMIA Guidance development and linkage from the DFMIR/FFMIA Guidance to one or more Business Processes.
- BEP DFMIR/FFMIA Guidance content that affects other BEPs should be socialized before the workshop.
- Avoid embedding term definitions in DFMIR/FFMIA Guidance. (Use AV-2 to define terms.)
- Ensure that all exception reports have been reviewed and resolved.
- Validate the existence of System Architect mapped Process names using spreadsheet macros such as VLOOKUP. This helps reduce errors in the load process.
- Try to avoid ambiguity.
- Simplify as much as possible by not over-explaining or adding unrelated information.
- Make sure subject is quantified and singular (e.g., by using the word “each”).
- Separate compound statements (“and” or “or”) into several individual DFMIR/FFMIA Guidance statements.
- Use the “If - Then” statement construct for conditional DFMIR/FFMIA Guidance statements.
- Ensure that the logical structure of the DFMIR/FFMIA Guidance makes sense.
- Review all domain specific DFMIR/FFMIA Guidance statements for contradictory or redundant statements.

#### **15.3.2.2 DFMIR/FFMIA Guidance Model Common Pitfalls**

- Ambiguity.
- Over-explaining or unrelated information.
- Contradictory or redundant statements.

## Appendix A: References

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- 1) *Introduction to BPMN*, Stephen A. White, IBM Corporation (date of publication unknown).
- 2) *Business Process Modeling Notation (BPMN)*, Version 1.0, Stephen A. White, Business Process Management Initiative, May 3, 2004.
- 3) *Semantics of Business Vocabulary and Business Rules version 1.0*, Object Management Group
- 4) *BRS RuleSpeak™, Version 1.0*, Ronald G. Ross and Gladys S.W. Lam
- 5) *Principles of the Business Rule Approach*, Ronald G. Ross
- 6) *Business Rule Concepts: Getting to the Point of Knowledge*, Ronald G. Ross
- 7) *BEA Development Methodology*, March 13, 2009
- 8) *Business Transformation Guidance. Version 1.1*, July 06, 2007
- 9) *DoD Architecture Framework (DoDAF), Version 1.5*, April 23, 2007
- 10) *Integrated Definition for Function Modeling (IDEF0)*
- 11) *Integrated Definition for Data Modeling (IDEF1X)*
- 12) *System Rule Concepts: Getting to the Point of Knowledge*, 2<sup>nd</sup> ed. System Rule Solutions, LLC, 2005

## Appendix B: Product Checklists

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### B-1: AV-1 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

		Reviewer Name:			
#	Source	BART Report	Inspection Item Description	Modeler	Reviewer
1	3.1.3	Manual	BEP Names and Descriptions should be same in Enterprise Transition Plan (ETP). BEP AV-1 is authoritative source for BEP Names, Description Goals and Objective.		
2	3.1.2	Manual	Lead and support Core Business Missions (CBM) should be correctly identified and in accordance with the ETP.		
3	3.1.2	Manual	Listing of “Products Developed” should be accurate and complete.		
4		Manual	All spelling is correct and there are no grammatical errors.		

## B-2: AV-2 Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-2-1: AV-2 Acronym Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	4.1.3	Manual	The acronym is described in Acronym List		
2	4.2.1.1	Manual	The acronym is not described in BEA product description with the exception of Business Guidance items.		
3	4.2.1.1	Manual	Short name is described in Acronym List.		
4		Manual	Plurals of acronyms are not described in Acronym List.		
5	3.1.3	Manual	If the acronym is used in the AV-1 Overview, then the acronym must be described at first use.		
6	3.1.3	Manual	If the acronym is used in the AV-1 Overview, then the acronym must be in the SA Acronym List.		
7	4.2.1.1	Manual	The acronym must be used within a BEA product description.		
8	4.2.3.1	Manual	All exception reports have been reviewed and resolved.		

## B-2-2: AV-2 Term Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	4.2.1.2	Manual	The term is not derived or computed from other terms.		
2	4.2.1.2	Manual	The term is not divisible, collective or composite.		
3	4.2.1.2	Manual	The term is not an event or action.		
4	4.2.1.2	Manual	The term is not subjective.		
5	3.2 4.2.1.2	Manual	If the term is used in the AV-1 Overview, then the term must be in the SA Term List.		
6	3.2 4.2.1.2	Manual	If the term is used in the AV-1 Overview, then the term description must be the same as the SA Term List description.		
7	4.2.1.2	Manual	The term must be used within a BEA product description.		
8		Manual	The term description must pass the MS Word spell and grammar check.		
9	4.2.3.1	Manual	All exception reports have been reviewed and resolved.		

## B-3: OV-2 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
 Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-3-1: OV-2 Diagrams Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1		Manual	Verified intended content changes with Subject Matter Expert		
2	9.2 9.3.1.2	Manual check	There is at least one OV-2 diagram for each internal Operational Node, which are CBMs.		
3	9.3.1.2	Manual Check	The OV-2 diagram does not have a border.		
4	9.3.1.2	Genrl-001	The OV-2 diagram has a Doc Block for header information that includes the title of the diagram on one line, its creation/modification date, but no graphic comments. The Doc Block is in the extreme upper left corner of the diagram with a black border, no fill color and no truncation indicators.		
5	9.3.1.1	Manual Check	Operational Nodes are depicted as light green ovals with black borders and black lettering (the SA default), with no truncation indicators.		
6	9.3.1.1	Manual Check	Operational Node names are in Arial 14, Normal and Black font.		
7	9.1.2	Manual Check	The Operational Node for the CBM represented by the diagram shall be shown at the center of the diagram. Only Operational Nodes that interface with the center Operational Node shall be shown on each diagram.		
8	9.1.2	Manual Check	Operational Activities are only displayed for the center Operational Node on the diagram.		
9	9.3.2.1	OV02-004	All existing Need Lines are used on at least one OV-2 Diagram.		
10	9.3.1.1	Manual Check	Need Lines are solid straight lines, containing 90-degree angles (where appropriate) to achieve readability.		
11	9.3.2.2	Manual Check	Need Lines use the default SA pen width and black font.		
12	9.3.2.2	Manual Check	Individual IEs are not displayed under the Need Lines on the OV-2 Diagram.		
13	9.3.2.2	Manual Check	Need Line arrows do not intersect, if at all possible.		
14	9.3.2.2	Manual Check	Need Line can exist on only two OV-2 diagrams unless is linked to an external Operational Node or if a sub-node exists.		



			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
15	9.3.1.2	Genrl-002	The OV-2 Diagrams have a narrative description of the diagram, using the diagram properties comment box to explain the Operational Nodes and their relationships.		
16	9.3.2.1	OV02-001	All Operational Nodes must be referenced by at least one Need Line		
17	9.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-3-2: OV-2 Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	9.3.1.3	OV02-007	Only the following valid Operational Node names are used: <ul style="list-style-type: none"> <li>• Acronyms for the CBMs</li> <li>• Enterprise Node</li> <li>• External Node</li> </ul>		
2	9.3.1.1	AV02-002 AV02-006 AV02-014	Operational Nodes shall be defined in accordance with the related CBM. Name checks shall include Operational Nodes with missing descriptions, short descriptions and truncated descriptions.		
3	9.3.2.1	OV02-007	Each Operational Node is identified by Type (“Abstract” or “Physical”).		
4	9.3.1.3	OV02-007	Need Line names are in the following format: Sending CBM – Receiving CBM (for example “HRM – FM”).		
5	9.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-3-3: OV-2 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	9.3.2.1	OV02-002	Each Operational Node is mapped to one or more leaf-level Operational Activities.		
2	9.3.2.1	OV05-019	Each leaf-level Activity is assigned to at least one Operational Node.		

			<b>Reviewer Name:</b>		
<b>#</b>	<b>Source APG</b>	<b>BART Report</b>	<b>Checklist Item Description</b>	<b>Modeler</b>	<b>Reviewer</b>
3	9.3.2.2	OV02-003	A Need Line includes one or more IEs.		
4	9.3.2.2	Manual Check	A single Need Line is used to represent the interactions of all IEs that have a common source and destination between a pair of Operational Nodes.		
5	9.3.2.1	OV02-005 OV02-006	Each Operational Node has only one CBM Stakeholder assigned, and one or more BEP Stakeholders assigned.		
6	9.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-4: OV-3 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-4-1: OV-3 Matrix Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	10.3.1	Manual Check	All fields in each column are filled in.		
2	10.3.1	Manual Check	The "Information Exchange Description" column contains the IE definition.		
3	10.3.1	OV03-003	IE names must be in title case, use only approved acronyms and can use only the special character "-".		
4	10.4.1	Manual	All exception reports have been reviewed and resolved.		

### B-4-2: OV-3 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	10.1.2	OV03-001	Each IE is mapped to one or more Entities or Attributes in the Logical Data Model (OV-7).		
2	10.2.1	OV03-002	Each IE is mapped to an ICOM Arrow.		
3	10.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-5: OV-5 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
 Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-5-1: OV-5 Diagrams Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
			<b>OV-5 Node Tree</b>		
1	5.1.2.1 5.3.1.2	Manual Check OV05-017	The OV-5 Node Tree Activity names match the Activity Diagram.		
2	5.3.1.2	Manual Check	The Activity boxes are numbered sequentially, relative to position and match corresponding activity numbering on the Activity Diagram.		
3	5.3.1.2	Manual Check	The top-level box of the Node Tree is centered on the diagram as permitted by the tool.		
4	5.1.4.1 5.3.1.2	OV05-034	Parent Activities are decomposed to at least two, but not more than nine, child Activities.		
5	5.3.1.1	Manual Check	The Operational Activity Node Tree follows modeling conventions:  Names are Normal and Black font. The Operational Activity box border shall be a solid black line. The integrated Operational Activities shall be white. The stand alone Operational Activities that appear on the Node Tree only shall be blue.		
6	5.2.3.1	Manual Check	Activities on the Node Tree should be decomposed to a level low enough to support the Business Capability.		
7	5.3.1.3	Manual Check	Each Operational Activity is named as a Verb-Noun, using an active verb phrase (for example, Allocate Resource).		
			<b>OV-5 Activity Diagrams</b>		
8	5.2.3.2	Manual Check	The A-0 Activity Diagram (Context Diagram) has a purpose and a viewpoint in the lower left corner of the diagram.		
			<b>Operational Activities</b>		
9	5.3.1.1 5.3.1.2 5.3.2	Manual Check	Activity names follow modeling conventions:  The font must be normal and Black. The Activity name begins with a RETURN character. Activity name falls within the Activity box border with no truncation indicators The Activity Box has a solid black line border. All activities should be colored Yellow.		

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
10	5.3.1.2 5.3.2	Manual Check	Activity boxes are numbered sequentially in the lower right corner. The number inside the Activity box shall match the last digit of the Activity number sitting outside the box beginning with an "A."  Activity boxes are stair-stepped vertically and numbered in descending order appropriately.		
11	5.2.3.2	OV05-014	Each Operational Activity has at least one (1) Input or Control and one (1) Output.		
12	5.3.2	OV05-033	Each Activity shall have at least one Mechanism and no more than 12 Mechanisms.		
13	5.3.1.2	OV05-22	Diagram name (Operational Activity box label) shall use title case (first letter of each word capitalized, other letters lowercase), should be non-plural (exception approved by BTA) and can use only the special character "-". Any acronyms used in the Operational Activity name must be from the approved acronym list that is part of the BEA AV-2.		
			<b>ICOMs</b>		
14	5.2.3.2	Manual Check	ICOMs follow modeling conventions:  Naming conventions for External Controls are "{Activity Name} Law Policy Reg" Initiatives are Internal Controls and are represented as Controls Mechanism are CBMs and/or Systems Controls and Mechanisms are stair-stepped in a descending manner from left to right in relation to the positioning of the activity.		
15	5.4.2	OV05-004 OV05-018	All ICOMs are physically connected to a given Activity.		
16	5.4.2	Manual Check	ICOM Arrows have minimal crossings in respect to other ICOM Arrows on any given diagram.		
17	5.3.2	AV02-019 OV05-003 OV05-005	Input ICOMs cannot be represented as Outputs for the same activity.  Output ICOMs cannot be represented as Inputs for the same activity.		
18		Manual Check	ICOMs are evenly spaced relative to the edge of an Activity box.		
19	5.3.2	Manual Check	Boundary Input ICOMs come into the diagram even with the first Activity it is attached to, Input ICOM names are left justified, Boundary Output ICOMs exit the diagram at even with the highest Activity it exits from, and names are right justified.		
20	5.3.2	Manual Check	Controls and Mechanisms are vertically aligned as per guidelines.		
21	5.3.2	Manual Check, OV05-035	ICOMs are balanced:  Input/Output ICOMs on a parent activity are consistent with Inputs/Outputs on its child diagram and vice versa		

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
			<b>General</b>		
22	5.3.1.1	Manual Check	The Node Tree diagram and Activity diagrams do not have a border.		
23	5.3.1.1 5.3.1.2	Genrl-001	The Node Tree diagram and Activity diagrams have a Doc Block for header information that includes the title of the diagram on one line, its creation/modification date, but no graphic comments. The Doc Block is in the extreme upper left corner of the diagram with a black border, no fill color and no truncation indicators.		
24	5.3.1.2	Genrl-002	The Node Tree diagram and Activity diagrams have a narrative description of the diagram, using the diagram properties comment box to explain the Activities and their relationships.		
25	5.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-5-2: OV-5 Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	5.3.1.3	AV02-018	Object names are unique and in the proper tense.		
2	5.3.1.3	AV02-010 AV02-011 AV02-012 AV02-013 AV02-009	Object names are in title case, do not end in “s”, and contain no special characters or invalid acronyms.		
3	5.3.2	AV02-005 AV02-006 AV02-002 AV02-014 Spell Check	Each Operational Activity and ICOM has a unique grammatically correct definition that has been spell checked.		
4	5.3.1.2	AV02-001 AV02-002 AV02-004 AV02-014 AV02-020	The Activity definition identifies what the Activity does, suitable to the level of decomposition and how information is transformed, created or consumed in the Activity.		
5	5.3.2	AV02-001 AV02-002 AV02-004 AV02-014 AV02-020	Each ICOM definition is consistent with the definition of the Activity that produces or consumes it and is consistently decomposed with the Activity. The definition of the Parent ICOM includes the list of child ICOMs.		

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
6	5.3.2	GENRL-003 GENRL-004	Each Activity and ICOM has one or more BEP and CBM Stakeholders assigned.		
7	5.4.1	Manual	All exception reports have been reviewed and resolved.		

### B-5-3: OV-5 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	5.1.3.2 5.2.3.3	OV06c-005	Each Leaf-Level Activity is mapped to one or more Leaf-Level Processes.		
2	5.2.3.1 5.2.3.3	OV05-015	Each leaf-level Activity is mapped to the FEA BRM Sub-functions.		
3	5.2.3.2 5.3.2	OV03-002 OV05-020 OV05-024	Each leaf-level Activity Input and Output ICOM has a corresponding IE, with the same name, definition and linked to the same BEPs and CBMs unless there are multiple IEs.  Controls and Mechanisms are not mapped to Information Exchanges.		
4	5.1.3.2 5.3.1.2 5.3.1.3	AV02-009 AV02-010 AV02-011 AV02-012 AV02-013 OV05-008	Object names use only approved abbreviations and acronyms contained in the AV-2 and are free of symbol characters, (for example, /, \$, @, &).		
5	5.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-6: OV-6a Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
 Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-6-1: OV-6a Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	6.3.2	Manual	Rule can be readily understood by any business or DoD party and is always interpreted the same.		
2	6.1	Manual	Rule is atomic.		
3	6.4.2	Manual	Rule is unambiguous.		
4	6.3.2	Manual	Rule is in declarative form – no reference to how, where, when, or who.		
5	6.1	Manual	No indication of how rule to be enforced (how).		
6	6.4.2	Manual	No indication of where to enforce the rule (where).		
7	6.4.2	Manual	No indication of when to enforce the rule (when).		
8	6.4.2	Manual	No indication of Events or Event sequence (when).		
9	6.4.2	Manual	No indication of who will enforce the rule (who).		
10	6.4.2	Manual	Rule is not procedural (use of “else” and “if”).		
11	6.4.2	Manual	Rule constrains (or alternatively permits).		
12	6.1.5	OV06a-009	Rule contains one of the key rule words such as “is,” “may,” “must,” “no,” “not,” “shall,” “should,” “will,” or “only if.”		
13	6.1.5	Manual	Words such as “can” are not used.		
14	6.1	Manual	Rule uses standard terminology such as the common language from the data model.		
15	6.4.2	Manual	Facts are explicitly expressed in the rule (no hidden facts or computations).		
16	6.1	Manual	Rule is written in <i>RuleSpeak</i> <sup>TM</sup> formal language.		
17	6.4.1	Manual	All exception reports have been reviewed and resolved.		
18	6.4.2	Manual	The rule does not have a plural subject.		
19	6.4.2	Manual	Plural objects in the sentence avoided.		
20	6..2	Manual	A time element is not the subject.		
21	6.4.2	Manual	Rule has explicit subject.		
22	6.4.2	Manual	Computations are the subject of the rule.		



## B-6-2: OV-6a Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	6.2.2.3	N/A	All required fields filled in properly from load.		
2	6.1.4, 6.3.1.1	OV06a-006	Each Operative Derivation Business Rule is linked to a BPM Process.		
3	6.1.4, 6.3.1.1	OV06a-005	Each Operative Action Business Rule is linked to Process Flow or BPM Process.		
4	6.1.4, 6.3.1.1	OV06a-007	Each Structural Relational Business Rule is linked to an OV-7 Relation or BPM Process.		
5	6.3.1.1	OV06a-013	Each Structural Definitional Business Rule is linked to an OV-7 Data Element or an AV-2 Term.		
6		OV06a-012	Each Business Rule must either have an Operative or Structural Category.		
7	6.3.1.1	OV06a-011	Each Business Rule that is an Operative Category must be either a Derivation Type or an Action Type.		
8	6.3.1.1	OV06a-014	Each Business Rule that is a Structural Category must be either a Relational Type or a Definitional Action Type.		
9	6.3.1.2	OV06a-015	All Business Rules must have unique rule number associated with it.		
10	6.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-7: OV-6c Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
 Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-7-1: OV-6c Diagrams Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1		Manual Check	Verified intended content changes with BEP Subject Matter Expert		
2	8.3.1	OV06c-014	All Diagrams have at least 2 Events and 2 Processes.		
3	8.2.3	Genrl-001	All OV-6c Diagrams have a Doc Block for header information that includes the title of the diagram on one line, its creation/modification date, but no graphic comments. The Doc Block is in the extreme upper left corner of the diagram with a black border, no fill color and no truncation indicators.		
4	8.3.1.2	Manual Check	Diagrams are named in accordance with APG OV-6c guidelines.		
5	8.3.1.2	Manual Check	The Pool structure is in accordance with the APG OV-6c guidelines.		
6	8.3.1.3	AV02-011	OV-6c objects must comply with naming conventions and not use special characters except for Question Marks at the end of Gateway names.		
7	8.2.3	OV06c-004	Data Objects are either associated with a Process Step (as an Input and/or Output), Input or Output Set, or linked to a Sequence Flow or Message Flow and are in accordance with APG OV-6c guidelines.		
8	8.2.3	OV06c-006 OV06c-007	Message Flows are used between Pools and Sequence Flows are used within Pools and are in accordance with APG OV-6c guidelines.		
9	8.3.1.2	General-002	The OV-6c Diagram has a narrative description of the diagram, using the diagram properties comment box to explain the Activities and their relationships.		
10	8.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-7-2: OV-6c Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	8.3.1.3	Genrl-008 AV02-009 AV02-010 AV02-011 AV02-012 AV02-013 AV02-020	All Pools, Swimlanes, Process Steps, Data Objects, Gateways, Events and groups are named and defined and are in accordance with APG OV-6c guidelines.  Names and definitions are optional for Sequence Flows and Message Flows		
2	8.3.1	AV02-013	Only approved acronyms have been used.		
3	8.2.3	OV06c-001	Events do not reference themselves.		
4	8.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-7-3: OV-6c Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	8.1.4	OV06c-005	Each leaf-level Process has been mapped to one or more leaf-level Activities in the OV-5.		
2	8.1.4	OV6a-005 OV6a-006	OV-6a non-SFIS Business Rules have been mapped to OV-6c Process Steps, Gateways, or Conditional Sequence Flows		
3	8.1.4	OV06c-015	All Data Objects must be mapped to one and only one Information Exchange.		
4	8.2.3	Genrl-003 Genrl-004	Each Process, Data Object, Event, or Gateway has one or more BEP and CBM Stakeholders assigned.		
5	8.2.5	AV02-004	All OV-6c objects must appear on a diagram.  <b>Exception:</b> Data Objects associated to Process Steps via an Input Set or an Output Set.		
6	8.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-8: OV-7 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
 Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-8-1: OV-7 Diagrams Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	7.2.1 7.2.2.1 7.2.2.3	Manual	Verified intended content changes with BEP Subject Matter Expert		
2	7.3.1.2	Manual	All diagrams are prefixed with the BEP Name or approved BEP acronym.		
3	7.3.1 7.3.1.2	Manual	All diagram titles match the diagram name.		
4	7.3.1.1 7.3.1.2	Manual	Each Diagram has a Doc Block describing the diagrams contents in sufficient detail as to aide the viewer in understanding the diagram.		
5	7.1.3 7.3.1.2	Manual	Diagram definitions must describe the intended use of the particular view and level of maturity information may be placed in the Notes area.		
6	7.3.2.1.1 7.3.2.1.2	OV07-006, OV07-018	All Entity names follow OV-7 section of the APG.		
7	7.3.2.2 7.3.2.2.1 7.3.2.2.2	OV07-001 OV07-002 OV07-004 OV07-011 OV07-016	All Attribute names follow OV-7 section of the APG.		
8	7.3.2.3 7.3.2.3.1 7.3.2.3.2	OV07-012 OV07-014	All Data Element names follow OV-7 section of the APG. (Never use a single Data Element to represent more than one Data Domain.)		
9	7.3.3.1.1 7.3.3.1.2	Manual	All Relationships between Entities follow OV-7 section of the APG		
10	7.3.2.1.4	OV07-018	Each Entity has a Primary Key.		
11	7.3.2.1.4	Manual	Each Primary Key uses the natural key when one is available.		
12	7.2 7.3 7.4	Manual	All diagramming techniques follow the OV-7 section of the APG.		
13	7.3.3.2.1	OV07-007	All Subtypes have the same primary key as the		

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
			super-type (Role-based names are allowed).		
14	7.3.3.2.1	Manual	All subtypes have one or more Attributes and/or one or more Relationships to differentiate them from the supertype and the other subtypes.		
15	7.4.2	OV07-009	All Child Entities have one or more Attributes that differentiate them from their parent Entity.		
16	7.3.2.1.1	OV07-009	Each Entity must contain at least one Attribute.		
17	7.2.2.3	Manual	Ensure that BEP and CBM Stakeholders agree with their representation on diagrams.		
18	7.2.2.3	Manual	Remove invalid and duplicate access paths that cause the display of AK1 designations in the primary key portion of Entities.		
19	7.2.2.3	Manual	Ensure that all Relationship lines on all OV-7 Diagrams display properly and are not hidden.		
20	7.2.2.3	Manual	Ensure that the associated tags of all Relationship lines are positioned properly on the diagram.		
21	7.2.2.3	Manual	Ensure that, at 21% zoom, all Attribute names are displayed on a single line within the Entity.		
22	7.2.2.3	Manual	Ensure that all Relationship lines are straight, not broken, and that all Relationship lines avoid crossing others whenever possible.		
23	7.3.1.2	Manual	Ensure that all diagram descriptions, diagram doc blocks, diagram notes, diagram names, object names and object descriptions are spell checked.		
24	7.3.1.1	Manual	Ensure that all Entities are colored properly.		
25	7.3	Manual	Ensure that all OV-7 printable diagrams display correctly.		
26	7.4.1	Manual	Ensure that all exception reports have been reviewed and resolved.		

## B-8-2: OV-7 Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	7.1.4 7.2.2.3	AV02-002	All objects are defined (Diagrams, Entities, Attributes and Data Elements).		
2	7.3.2.1.2	AV02-002	All Entity definitions follow OV-7 section of the APG.		
3	7.3.2.2.3	OV07-008 AV02-002	All Attribute definitions follow OV-7 section of the APG.		

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
4	7.3.2.3.2	AV02-002	All Data Element definitions follow OV-7 section of the APG.		
5	7.3.3.2.2	OV07-010	Logical View IDEF1X Categorizations have a Name and Discriminator		
6	7.1.4 7.2.2.3	Manual	Ensure that words on the “Terms” list are represented correctly and consistently in all object names and descriptions. Ensure that the Terms are not redefined within definitions.		
7	7.2.2.3	OV07-021	Ensure that all table names exactly match their corresponding Entity names with “_” separating the terms instead of “-”.		
8	7.2.2.3	Manual	Ensure that all the primary index and access path names exactly match the Table Name with the addition of the “_PK” suffix. This will remove the existing “-” and replace them with “_” as used in the Table Names.		
9	7.2.2.3	Manual	Ensure that the IDEF1X categorization names match the discriminator Attribute names with the removal of their class word and the replacement of the “_” between terms with spaces.		
10	7.2.2.3	Manual	Ensure that all column names exactly match their corresponding Attribute names.		
11	7.2.2.3	AV02-004 OV07-015	Remove OV-7 objects from the encyclopedia which are not on or referenced from any OV-7 Diagram		
12	7.4.1	Manual	Ensure that all exception reports are reviewed and resolved.		

### B-8-3: OV-7 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	7.2.2.3 7.2.2.4 7.1.4	Manual	By-product changes resulting from the CR solution have been identified (Items 2 thru 7 below).		
2	7.2	OV05-008 OV03-001	Each OV-3 IE within the scope of a BEP is related to one or more OV-7 Entities or Attributes within Entities.		
3	7.2.2.2	OV07-013	All OV-7 Entities provided by the BEP are accounted for in the BEP’s IEs in their OV-3 or within OV-6a derivation rules.		
4	7.2.1	OV07-005	All Data Synonyms in the OV-3 IEs link to one or more OV-7 Attributes attached to the same IE.		

			<b>Reviewer Name:</b>		
<b>#</b>	<b>Source APG</b>	<b>BART Report</b>	<b>Checklist Item Description</b>	<b>Modeler</b>	<b>Reviewer</b>
5	7.3.2.6 7.2 7.2.2.2	Manual	All BEP provided Data Synonyms are linked to one or more Attributes with Derivation Business Rule(s) created to resolve any derived data.		
6	7.3.2.3	OV07-005	All BEP provided Data Elements are linked to one or more Attributes within one or more Entities within the BEP's OV-7.		
7	7.2.2.1	Manual	Any Data Elements required by the BEP for system certification are identified.		
8	7.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-9: SV-1 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_  
Contractor Team Lead \_\_\_\_\_

Approval Signatures: \_\_\_\_\_  
Government Product Lead \_\_\_\_\_

### B-9-1: SV-1 Diagrams Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1		Manual	Verified intended content changes with Subject Matter Expert		
2	11.3.1.2	Manual	There is a SV-1 for each CBM that has identified Enterprise Systems for the BEA and an External SV-1 to reflect DoD use with federally mandated systems.		
3	.11.3.1.2	Manual	Each SV-1 diagram has a Diagram Description.		
4	11.3.1.2	Manual	Each SV-1 diagram has a Doc Block representing header information for the diagram (including the diagram name and date last updated) that is placed at the top left of every diagram.		
5	11.3.1.2	Manual	Doc Block has been enlarged so there are no truncation indicators (dots) indicating text is not visible.		
6	11.3.1.2	Manual	The Doc Block has a box with no fill and a black border.		
7	11.3.1.2	Manual	The SV-1 diagram name is the name of the focus CBM or External system node, light green, on the diagram.		
8	11.3.1.1	Manual	All System Node labels are Arial 14, Bold and Black font.		
9	11.3.1	Manual	All System Node labels are top center of the System Node border and the label does not fall outside the boundary of the ellipse.		
10	11.3.1.1	Manual	Internal System Nodes are elliptical with a light blue fill and black border.		
11	11.3.1.1	Manual	The central System Node on each diagram is elliptical with a light green fill and a black border.		
12	11.3.1.1	Manual	The external System Nodes is elliptical with a light gray fill and a black border.		
13	11.3.1.1	Manual	All System Entity labels are Arial 10, Bold and Black font.		
14	11.3.1	Manual	All System Entity labels are at top center of the System Entity box and the label should not fall outside the box boundary.		
15	11.3.1.1	Manual	Enterprise-level System Entities are yellow boxes with a black border.		
16	11.3.1.1	Manual	Family of System Entities are light orange boxes with a black border.		



			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
17	11.3.1	Manual	Each System Node may contain a Family of System Entity.		
18	11.3.1.1	Manual	Non-DoD System Entities are white boxes with a black border.		
19	11.3.1	Manual	All System Entities are contained within their associated System Node elliptical boundary.		
20	11.2.2.1	SV01-004 SV01-003	Each internal System Entity lists related System Functions.		
21	11.3.1.3	Manual	The naming convention for System Interfaces is “sending System Entity abbreviation”- “receiving System Entity abbreviation.”		
22	11.3.1.1	Manual	System Interface labels are placed, where possible, above the horizontal line where most visible and close to the arrowhead.		
23	11.3.1.	Manual	System Interface lines should not traverse intermediate System Entities.		
24	11.3.1.	Manual	To the maximum extent possible, System Interface lines should not cross intermediate System Nodes.		
25	11.3.1	Manual	System Interface arrows are black with black filled arrowheads.		
26	11.3.1	Manual	System Interfaces connect to a System Entity at both ends.		
27	11.3.1.1	Manual	System Interfaces are solid, straight, lines with 90-degree curves, when necessary.		
28	11.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-9-2: SV-1 Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	11.3.1.2.	Manual	Each SV-1 has a diagram description that explains what it represents and a brief description of the Enterprise Systems.		
2	11.3.1.2.	Manual	Each System Node has a definition consistent with that of the related Operational Node.		
3	11.1.4	Manual	Each System Entity has a description of what the Enterprise System does.		
4	11.1.4	Manual	Each SDE has a description of the data it represents.		

## B-9-3: SV-1 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	11.2.2.1, 11.2.2..3	SV01-002	Operational Nodes (Physical Nodes) are assigned to the System Node from the OV-2, excluding External sub nodes.		
2	11.2.2.3	SV01-004 SV01-003	Each BEA Enterprise System must have at least one System Function assigned.		
3	11.2.1.2	Manual	System Entities have both BEP and CBM Stakeholders assigned.		
4	11.3.1	Manual	System Entities must have a Parent system assigned.		
5	11.2.1.2	Manual	System Interfaces between System Entities reflect Need Lines from the OV-2.		
6	11.2.2.1	SV01-001	Each System Interface must link to at least one SDE		
7	11.2.1.2	SV01-005	Each SDE must link to at least one IE from the OV-3.		
8	11.2.1.2	Manual	System Interfaces between Family of System Entities reflects Need Lines from the OV-2 and IEs from the OV-3.		

## B-10: SV-5 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-10-1: SV-5 Matrix Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	12.3.1.	Manual	There is one SV-5 matrix that represents all CBMs.		
2	12.3.1.	Manual	The SV-5 consists of Business Capabilities, Operational Activities, and System Functions and Enterprise-level Systems.		
3	12.3.1.	SV04-009	All systems functions must be referenced by at least one Operational Activity.		
4	12.2.2.3	Manual	All exception reports have been reviewed and resolved.		

### B-10-2: SV-5 Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	12.1.4 12.3.1.2	Manual	Each Business Capability shall have a definition.		
2	12.1.4	Manual	Each System Function should describe the automation of the OV-5 leaf-level Operational Activity it supports.		
3	12.2.2.3	Manual	All exception reports have been reviewed and resolved.		

### B-10-3: SV-5 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	12.3.1.1	Manual	The SV-5 matrix only contains relationships between leaf-level Operational Activities, Business Capabilities, Enterprise-level systems and System Functions.		
2	12.3.1.1	Manual	Each System Function should map to at least one leaf-level Operational Activity with an Enterprise System/Enterprise Entity Name, FoS or by an "X".		
3	12.2.1.2	Manual	Each System Function must have at least one BEP Stakeholder.		

			<b>Reviewer Name:</b>		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
4	12.3.1.2	Manual	Each System Function must have at least one CBM Stakeholder.		
5	12.2.1.	Manual	The SV-5 must be consistent with the ETP		
6		Manual	System Functions shall be used to develop Enterprise Sub-Services		
7	12.2.2.3	Manual	All exception reports have been reviewed and resolved.		

## B-11: SV-6 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
 Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-11-1: SV-6 Matrix Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	13.1.2	Manual	There is a System Interface abbreviation from the SV-1 diagram in the first column of the SV-6 matrix.		
2	13.1.2	Manual	Corresponding SDEs for each System Interface appear in the second column.		
3	13.1.3	Manual	System Interface Sending System Entity and System Function from the SV-1 diagram appear.		
4	13.1.3	Manual	The Sending System Node from the SV-1 appears.		
5	13.2.3	Manual	System Interface Receiving System Entity and System Function from the SV-1 appear.		
6	13.1.2	Manual	The Receiving System Node from the SV-1 appears.		
7	13.1.3	Manual	The Data Entity for the SDE appears.		
8	13.4.1	Manual	All exception reports have been reviewed and resolved.		

### B-11-2: SV-6 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	13.2.3	Manual	The SV-6 only shows System Interfaces between System Nodes.		
2		Manual	Each SDE has a corresponding OV-7 Data Entity		
3	13.4.1	Manual	All exception reports have been reviewed and resolved.		

## B-12: TV-1 Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-12-1: TV-1 Definitions Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	14.1.2	Manual	The Standards are mandated in the DoD Information Technology Standards Registry.		
2	14.1.2	Manual	Brief descriptions for the Information Technology Standards are provided.		
3	14.1.2	Manual	References to the Standard administration/publishing organization are provided.		
4	14.1.2	Manual	DISR reference to where the Standards details can be obtained is provided.		
5	14.3.1	Manual	All exception reports have been reviewed and resolved		

### B-12-2: TV-1 Integration Checklist

			Reviewer Name:		
#	Source APG	BART Report	Checklist Item Description	Modeler	Reviewer
1	14.1.2	Manual	Each Technical Service shall map to a Technology Service Area, which represents a Core Service Area of the DoD EA TRM.		
2	14.1.2	Manual	Each Standard shall link to the Technical Service it supports.		
3	14.1.2	Manual	Each Technical Service shall link to Enterprise Sub-Services that it supports.		
4	14.3.1	Manual	All exception reports have been reviewed and resolved.		

## B-13: DFMIR/FFMIA Guidance Product Checklist

CR#: \_\_\_\_\_ Date: \_\_\_\_\_ Approval Signatures:  
Contractor Team Lead \_\_\_\_\_ Government Product Lead \_\_\_\_\_

### B-13-1: DFMIR/FFMIA Guidance Product Checklist

#	Source	BART Report	Reviewer Name:	Modeler	Reviewer
			Checklist Item Description		
1		N / A	Each FFMIA/DFMIR Guidance Name is correctly spelled.		
2		N / A	Each FFMIA/DFMIR s Guidance Description is correctly spelled.		
3	15.1.4 15.3.1	N / A	Each FFMIA/DFMIR Guidance must have unique rule number associated with it.		
4		N/ A	Each FFMIA/DFMIR Guidance has a corresponding LRP Source Definition that has the same Name value as the LRP Source value in the FFMIA/DFMIR Guidance.		
5		N / A	Each corresponding LRP Source Definition has a Description value and is correctly spelled.		
6		N / A	Each corresponding LRP Source Definition has a Primary Reference value.		
7		N / A	Each corresponding LRP Source Definition has a Link value that is the same as the Name value of the LRP Source Definition.		
8	15.4.1	Manual	All exception reports have been reviewed and resolved.		

### B-13-2: DFMIR/FFMIA Guidance Integration Checklist

#	Source	BART Report	Reviewer Name:	Modeler	Reviewer
			Checklist Item Description		
1	15.1.4	N/A	All required fields filled in properly from load.		
2	15.1.4 15.3.1	N / A	Each FFMIA/DFMIR Guidance statement must have unique rule number associated with it.		
3	15.1.4	N / A	Each FFMIA/DFMIR Guidance statement must be linked to at least one BPM Process.		
4	15.1.4	N / A	Each FFMIA/DFMIR Guidance statement must be linked to at least one LRP.		

#	Source	BART Report	Reviewer Name:	Modeler	Reviewer
			Checklist Item Description		
5	15.1.4 15.3.1	N /A	Each FFMIA/DFMIR Guidance statement must be linked to at least one Stakeholder.		
6	15.4.1	Manual	All exception reports have been resolved.		



## Appendix C: Glossary

Table C-1, Glossary, contains a list of terms and associated descriptions used in this document.

**Table C-1, Glossary**

Term	Description
A-0 Diagram	The special case of a one-box IDEF0 A-0, containing the top-level function being modeled and its Inputs, Controls, Outputs, and Mechanisms, along with statements of model purpose and viewpoint.
A0 Diagram	An IDEF0 diagram contains the first tier sub-activities under the A-0 diagram, their ICOM relationships, their Inputs, Controls, Outputs, and Mechanisms, along with a diagram description.
Abstract Processes	See Public Processes. [OV-6c]
Acronym	The initials of a standard phrase used in the BEA or ETP.
Activity Box	Represented by an enclosed rectangular box within which an operational function is performed in conducting the business of the enterprise.
Activity [OV-6c]	Business Process Modeling Notation uses the term “Activity” to mean work that can be performed within a Business Process. An activity can be atomic or non-atomic (compound). The types of activities that are a part of an OV-6c Business Process Diagram are Process Step, Sub-Process and Task. OV-6c uses the term “Process Step” to avoid confusion with the term “Activity” used in OV-5 to mean “Operational Activity.”
Action Assertion Business Rule	These rules concern some dynamic aspects of the business and specify constraints on the results that actions produce. There are three types of action assertions: <ul style="list-style-type: none"> <li>– Condition: This is a guard or the “if” portion of an “if-then” statement. If the condition is true, it may signal the need to enforce or test additional action assertions.</li> <li>– Integrity Constraint: These must always be true (for example, a declarative statement).</li> <li>– Authorization: This restricts certain actions to certain human roles or users.</li> </ul>
AND-Split	See “Fork (AND-Split)”. [OV-6c]
AND-Join	See “Join (AND-Join)”. [OV-6c]
Arrow	A directed line, composed of one or more arrow segments, that models an open channel or conduit conveying data or objects from source (no arrowhead) to use (with arrowhead). There are four arrow classes: Input Arrow, Output Arrow, Control Arrow and Mechanism Arrow (includes Call Arrow).
Arrow Label	A noun or noun phrase associated with an IDEF0 arrow or arrow segment, specifying its meaning.
Arrow Segment	A line segment that originates or terminates at a box side, a branch (fork or join), or a boundary (unconnected end).
Attribute	An Attribute is a property or characteristic that is common to some or all of the instances of an Entity. Attributes that identify Entities are key Attributes. Attributes that describe an Entity are non-key Attributes. Attributes are associated to one and only one Entity and represent the normalized view of Data Elements within OV-7 Entities.
Artifact	A graphical object that shows additional information about a process that is not directly related to the Sequence Flow or Message Flow. There are three artifacts: Data Objects, Groups and Annotations. [OV-6c]

Term	Description
Association	An Association is used to link information with Flow Objects. An Association may or may not have direction. [OV-6c]
Availability	Timely, reliable access to data and information services for authorized users.
Boundary Arrow	An arrow with one end (source or use) not connected to any box on a diagram. Contrast with Internal Arrow.
Boundary Arrow Box	A rectangle, containing a name and number, used to represent a function.
Box Name	The verb or verb phrase placed inside an IDEF0 box to describe the modeled function.
Box Number	The number (0 to 9) placed inside the lower right corner of an IDEF0 box to uniquely identify the box on a diagram.
BPM Event	See “Event”.
BPM Process	See “Process”.
Branch	A junction (fork or join) of two or more arrow segments.
Branching Point	Branching points are Gateways within a Business Process where the flow of control can take one or more alternative paths. Synonymous with <i>Decision</i> . [OV-6c]
Bundling/Unbundling	The combining of arrow meanings into a composite meaning (bundling), or the separation of arrow meanings (unbundling), expressed by arrow join and fork syntax.
Business Capability	This is the ability to execute a specific course of action. It can be a single business enabler or a combination of business enablers (e.g., business processes, policies, people, tools and systems information) that assist an organization in delivering value to its customer.
Business Enterprise Priorities (BEP) Stakeholder	<p>A Business Enterprise Priority (BEP) is an area where transformed business operations will provide improved warfighter support, reduced costs and better regulatory compliance. A BEP is formulated based on requirements identified by the warfighter, the Components and BTA.</p> <p>Initial priorities in the BEA are:</p> <ol style="list-style-type: none"> <li>1) Acquisition Visibility</li> <li>2) Common Supplier Engagement</li> <li>3) Financial Visibility</li> <li>4) Materiel Visibility</li> <li>5) Personnel Visibility</li> <li>6) Real Property Accountability.</li> </ol>
Business Process	A Business Process is a set of activities that are performed within an organization or across organizations. A Business Process, as shown in a Business Process Diagram, may contain more than one separate process. [OV-6c]
Business Rule	Listed in the OV-6a, a Business Rule is a “constraint on an enterprise, a mission, operation, business, or architecture”. A Business Rule describes what the business must or cannot do. A Business Rule is “an atomic piece of business logic, specified declaratively, whose intent is to control, guide, or enhance behavior.”
Call Arrow	A type of Mechanism Arrow that enables the sharing of detail between models (linking them together) or within a model.
Categorization Relationship	A relationship in which instances of both Entities represent the same real or abstract thing. One Entity, Supertype, represents the complete set of things the other Subtype represents a sub-type or sub-classification of those things. The Subtype may have one or more characteristics or a Relationship with instances of another Entity not shared by all Supertype instances. Each instance of the Subtype is simultaneously an instance of the Supertype.

Term	Description
Child Box	A box on a Child diagram.
Child Diagram	The diagram that details a Parent box.
Class Word	A Class Word is a word selected from a specified list that is used in an Attribute name to establish the general structure and domain of that Attribute.
Collaborative Process	A collaboration process depicts the interactions between two or more business Entities. This is shown as two or more processes communicating with each other. In OV-6c, collaborative processes also include processes from the same Business Entity, but commonly assigned to a different higher-level process. [OV-6c]
Collapsed Sub-Process	A collapsed Sub-Process is a graphical representation of a Process Step in which the details of the Sub-Process are not visible in the diagram. This is indicated by a “+” stereotype. [OV-6c]
Conditional Flow	A Sequence Flow that has a condition expression evaluated at run time to determine whether the flow will be used. [OV-6c]
Confidentiality	Assurance that information is not disclosed to unauthorized individuals, processes or devices.
Connecting Objects	Connecting objects connect Flow Objects together. There are three connecting objects: Sequence Flow, Message Flow and Association. [OV-6c]
Context	The immediate environment in which a function (or set of functions on a diagram) operates.
Context Diagram	A diagram that presents the context of a model, whose node number is A-n (n greater than or equal to zero). The one-box A-0 is a required A-0; that with node numbers A-1, A-2, are optional A-0s.
Control Arrow	The class of arrows that express IDEF0 Control, that is, conditions required to produce correct Output. Data or objects modeled as Controls may be transformed by the function, creating Output. Control arrows are associated with the topside of an IDEF0 box.
Core Business Mission (CBM) Stakeholder	The CBM Stakeholder for an OV-6c process is one or more of the Core Business Missions that is responsible for executing that process.
Criticality	The criticality assessment of the information being exchanged in relationship to the mission being performed.
Data-Based Decision	A Gateway in which the Decision represents a branching point where Alternatives are based on conditional expressions based on data contained within the outgoing Sequence Flow. [OV-6c]
Data Element	A Data Element is the smallest unit of stored data, which means that it cannot be broken down further, or that it makes no sense to break it down further. The Data Element, however, can inherit properties from a Data Domain. Data Elements are unique across the BMA and are associated with Attributes within the BEA.
Data Synonym	Data Synonyms are optional BEA-defined constructs used to describe Data in alternate terms familiar to the business user. Data Synonyms exist in the context of a particular Information Exchange and must be associated to one or more Attributes mapped to the same IE.
Data Model	A graphical and textual representation of analysis that identifies the data needed by an organization to achieve its mission, functions, goals, objectives, and strategies and to manage and rate the organization. A data model identifies the Entities, domains (Attributes) and Relationships (or associations) with other data.
Data Object	Additional information on an OV-6c, which does not have any direct effect on the Sequence Flow or Message Flow but does show the data that may be passed, created, or consumed by the BPM Process. Data Objects are a mechanism to show how data is

Term	Description
	required or produced by Process Steps. A Data Object is considered an artifact because it does not have a direct effect on the Sequence or Message Flow of the process. [OV-6c]
Decision	See “Branching Point”. [OV-6c]
Decision (OR-Split)	Synonymous with “Branching Point.” [OV-6c]
Decomposition	The partitioning of a modeled function into its component functions.
Default Flow	Sequence Flow, for Data-Based Exclusive Decisions or Inclusive Decisions, which shall be used only if all the other outgoing Conditional Flows are not true at run time. [OV-6c]
Derivation Business Rule	These rules concern algorithms used to compute a derivable fact from other terms, facts, derivations, or action assertions.
Description	Text description of mission or role being performed by the Node.
Diagram	A single unit of an IDEF0 Model that presents the details of a box.
Diagram Node Number	That part of a diagram’s node references that corresponds to its Parent box node number.
End Event	An Event that indicates where the process concludes. [OV-6c]
Enterprise Sub-Services	Used in the SV-TV Bridge, it describes the intersection between enterprise systems and Technical Services, and defines Standard attributes to bring order to that point.
Entity	An Entity is the representation of a set of real or abstract things (people, objects, places, events, ideas, combination of things, etc.) that are recognized as the same type because they share the same characteristics and can participate in the same Relationships.
Event	An Event is something that happens during the course of a Business Process. These Events affect the flow of the process and usually have a cause (trigger) or an impact (result). Events are represented as circles with open centers to allow internal markers to differentiate different triggers or results. There are three types of Events, based on when they affect the flow: Start, Intermediate and End. [OV-6c]
Event-Based Decision	The Decision represents a branching point where Alternatives are based on an Event that occurs at a particular point in the process. [OV-6c]
Event Name	Name of the Event that triggers the IE.
Exception Flow	Sequence Flow occurring outside the Normal Flow of the process and is based upon an Intermediate Event that occurs during the performance of the process. [OV-6c]
Exclusive Gateway (XOR)	An Exclusive Gateway restricts the flow such that only one of a set of alternatives may be chosen during runtime. There are two types of Exclusive Gateways: Data-based and Event-based. Also see “Inclusive Decision”. [OV-6c]
Expanded Sub-Process	An expanded Sub-Process is a graphical representation of a Sub-Process in which the boundary of the Sub-Process icon is expanded and the details (a process) are visible within its boundary. [OV-6c]
Flow Object	Flow Objects are the main graphical elements to define the behavior of a Business Process. The three Flow Objects are Events, Process Steps and Gateways. [OV-6c]
Fork	The junction where an IDEF0 arrow segment (going from source to use) divides into two or more arrow segments. May denote unbundling of meaning.
Fork (AND-Split) [OV-6c]	Dividing a path into two or more parallel paths, where Process Steps can be performed concurrently, rather than sequentially. [OV-6c]
Function	An activity, process, or transformation (modeled by an IDEF0 box) identified by a verb

Term	Description
	or verb phrase that describes what must be accomplished.
Gateway	Used on an OV-6c, this Flow Object controls the divergence and convergence of multiple Sequence Flows. [OV-6c]
Grouped Attribute	Grouped Attributes bring together several Attributes in a particular order to form a group. The classic example of a Grouped Attribute is Person Name that brings together First Name, Middle Name and Last Name.
ICOM	The acronym of Input, Control, Output, Mechanism. A code that associates the Boundary Arrows of a Child diagram with the arrows of its Parent box; also used for reference purposes.
IDEF0 Model	A graphic description of a system or subject that is developed for a specific purpose and from a selected viewpoint. A set of one or more IDEF0 diagrams that depict the functions of a system or subject area with graphics, text and glossary
ICOM Arrow	<p>Used on an OV-5, it represents the Input, Control, Output, or Mechanism that defines information relationships in an Activity Model.</p> <ul style="list-style-type: none"> <li>– Input: Information received from another Operational Activity, either internal or external to the model, which is needed for the given Operational Activity to be carried out.</li> <li>– Control: Information that affects the way an activity is performed or that constrains that activity. Primary sources are policies, regulations and laws. BEP initiatives are also reflected as Controls to emphasize the impact on a specific activity of those business transformation concepts. In the BEA, there are two types of Controls: External and Internal. External Controls are decomposed from the LRP Parent. Internal Controls are Initiatives that are created as Outputs from other Operational Activities within the BEA OV-5 Activity Model.</li> <li>– Output: Information that has been transformed or created by the Operational Activity and is sent to another internal Operational Activity or to an external activity (one outside the scope of the model/viewpoint).</li> <li>– Mechanism: Resource used to perform the activity. Mechanisms will be CBMs and those Systems or Initiatives defined by the BEP Executives.</li> </ul>
Identified Relationship	A specific connection relationship in which every Attribute in the Primary Key of the Parent is contained in the Primary Key of the Child Entity.
Inclusive Decision	A branching point (Gateway) where Alternatives are based on conditional expressions contained within the Sequence Flow. Since each path is independent, all combinations of the paths may be taken. Also see “Exclusive Gateway”. [OV-6c]
Integrity	Quality of an IS reflecting the logical correctness and reliability of the operating system; the logical completeness of the hardware and software implementing the protection mechanisms; and the consistency of the data structures and occurrence of the stored data. Note that, in a formal security mode, integrity is interpreted more narrowly to mean protection against unauthorized modification or destruction of information.
Intermediate Event	An Event that occurs between a Start Event and an End Event. It affects the flow of the process, but will not start or (directly) terminate the process. [OV-6c]
Information Exchange	Listed in the OV-3, shows the Information Exchanged between two Operational Nodes. A corresponding leaf-level Activity Input or Output ICOM is associated to the IE with the same name, definition, CBM Stakeholder and BEP Stakeholder.
Information Exchange Identifier	Identifier for the IE – usually based on the relevant Need Line identifier; should be unique for the architecture.
Input Arrow	<p>The class of arrows that expresses IDEF0 Input that is the data or objects that are transformed by the function into Output.</p> <p>Input arrows are associated with the left side of an IDEF0 box.</p>

Term	Description
Interface	A shared boundary across which data or objects are passed; the connection between two or more model components for the purpose of passing data or objects from one to the other.
Internal Arrow	An Input, Control, or Output arrow connected at both ends (source and use) to a box on a diagram. Contrast with Boundary Arrow.
Interoperability Level Required	Level of information systems interoperability, or other interoperability measure, required.
Join	The junction at which an IDEF0 arrow segment (going from source to use) merges with one or more other arrow segments to form a single arrow segment. May denote bundling of arrow segment meanings.
Join (AND-Join) [OV-6c]	A Gateway that combines two or more parallel paths into one path. Synonymous with “AND-Join” and “synchronization”. [OV-6c].
Lane	A Lane is a sub-partition within a Pool and extends the entire length of the Pool. Lanes are used to organize and categorize Process Steps within a Pool (representing a single Business Entity). [OV-6c]
Leaf-level	Refers to the lowest level of detail described for a given Operational Activity, system, or process model. It represents the lowest level of decomposition of higher-level models needed to represent objects and relationships of interest to the topic under study.
Level Identifier	If using hierarchical decomposition of Nodes: identifier that corresponds to the Node’s place in the Node hierarchy.
Logical Data Model	The OV-7 data model that provides the structure for organizing the data as well as the metadata need for an understanding of the data. The OV-7 can serve as a guide for the acquisition and evaluation of systems by assisting portfolio managers in quantitatively assessing the contents of their portfolios in the evaluation of how well the alternative solutions meet the data needs of the BMA.
Mandatory Non-Identified Relationship	A non-identified Relationship in which an instance of the Child Entity must be related to an instance of the Parent Entity.
Mechanism Arrow	The class of arrows that express IDEF0 Mechanism, that is, the means used to perform a function; includes the special case of call arrow. Mechanism Arrows are associated with the bottom side of an IDEF0 box.
Merging (OR-Join)	Merging exclusively combines two or more paths into one path. A Merge Gateway represents merging. [OV-6c]
Message Flow	A Message Flow shows the flow of messages between two Entities that are prepared to send and receive them. Two separate Pools in the Diagram will represent the two business Entities. [OV-6c]
Model Note	A textual comment that is part of an IDEF0 diagram used to record a fact not otherwise depicted.
Name	Name or label of Node box on diagram.
Need Line	Shown on an OV-2, it documents the requirement to exchange information between Operational Nodes. Arrows on Need Lines indicate the direction of the information flow. Each arrow only indicates that there is a need for some kind of information transfer between the two connected nodes, not how the information transfer is implemented.
Need Line Identifier	Identifier for the Need Line that carries the exchange.
Node	A box from which Child boxes originate; a Parent box.
Node Index	A listing, often indented, showing nodes in an IDEF0 Model in outline order. Same



Term	Description
	meaning and content as Node Tree.
Node Reference	A code assigned to a diagram to identify it and to specify its position in the model hierarchy; composed of the model name (abbreviated) and the diagram node number, with optional extensions.
Node Tree	The graphical representation of the Parent-Child relationships between the Nodes of an IDEF0 Model, in the form of a graphical tree.
Non-Identified Relationship	A specific connection Relationship in which at least one of the Attributes contained in the Primary Key of the Parent does not participate in the Primary Key on the Child Entity.
Non-Specific Relationship	Non-specific Relationship: A Relationship in which an instance of either Entity can be related to a number of instances of the other.
Normal Flow	Normal Sequence Flow refers to the flow that originates from a Start Event and continues through Process Steps via alternative and parallel paths until it ends at an End Event. [OV-6c]
Normal Form	Normal form is the condition of an Entity relative to satisfaction of a set of normalization theory constraints on its attribution. A specific normal form is achieved by successive reduction of an Entity from its existing condition to some more desirable form.
Normalization	The process of refining and regrouping Attributes in Entities according to the normal forms.
Operational Activity	An activity is an action performed in conducting the business of an enterprise. It is a general term that does not imply a placement in a hierarchy (e.g., it could be a process or a task as defined in other documents and it could be at any level of the hierarchy of the Operational Activity Model). It is used to portray operational actions not hardware/software System Functions. [OV-5]
Operational Activity Name	Name of the Operational Activity (at the originating Node of the Need Line) that produces the IE.
Operational Node	Shown in an OV-2, it describes what type of mission or role will be performed within an organizational unit. It is a job performed within an organizational unit.
Operational Node Name	Name of the Operational Node that produces the IE.
Optional Non-Identified Relationship	A non-identified Relationship in which an instance of the Child Entity can exist without being related to an instance of the Parent Entity.
OR-Split	See “Decision”. [OV-6c]
Organizational Unit	An Organizational Unit is a business organized in terms of roles also known as Operational Nodes. Each Organizational Unit includes a list of roles performed within that Organizational Unit only. In the BEA, CBMs represent Organizational Units.
Output Arrow	The class of arrows that express IDEF0 Output; that is, the data or objects produced by a function. Output arrows are associated with the right side of an IDEF0 box.
Parent Box	A box that is detailed by a Child diagram.
Parent Diagram	A diagram that contains a Parent box.
Participant	A Participant is a single business Entity or a business role, which controls or is responsible for a Business Process. A Pool represents a Participant in the process. [OV-6c]
Periodicity	How often the IE occurs; may be an average or a worst-case estimate and may include conditions (for example, wartime or peacetime).
Persistent Data	Data that has been saved and remains available even when it is not being used.

Term	Description
Pool	A Pool represents a Participant – a single Business Entity – in a process. It also acts as a Swimlane and a graphical container for partitioning a set of Process Steps from other Pools. [OV-6c]
Primary Key Attribute	Represented by one or more textual names in the upper portion of the Entity box. Primary Key Attributes contain characteristics that uniquely define a single instance of an Entity.
Private Business Process	Private Business Processes are those internal to a specific organization and are the types of processes that have been generally called workflow or BPM Processes. [OV-6c]
Process	Used on an OV-6c, this denotes a set of activities performed within a business organization, where an activity (not to be confused with the OV-5 usage for ‘Operational Activity’) is a generic term for work that a business organization performs. A BPM Process is depicted as a graph of Flow Objects, which are a set of other Process Steps and the controls that sequence them. [OV-6c]
Process Break	A location in a process that shows where an expected delay will occur within a process. An Intermediate Event is used to show the actual behavior. [OV-6c]
Process Step	Work that can be performed within a Business Process. A Process Step can be atomic or non-atomic (compound). The types of Process Steps that are a part of an OV-6c Business Process Diagram are: Process Step, Sub-Process and Task.  The term “Process Step” is a synonym for the Business Process Modeling Notation term “Activity.” OV-6c uses the term “Process Step” to avoid confusion with the OV-5 term “Activity,” representing an “Operational Activity.” [OV-6c]
Protection Duration	How long the information must be safeguarded.
Protection Suspense Calendar Date	The calendar date on which the designated level of safeguarding discontinues.
Protection Type Name	The name for the type of protection.
Public Processes	Public processes represent the interaction between a private Business Process and another process or participant. Only those activities that are used to communicate outside the private Business Process, plus the appropriate flow control mechanisms, are included in the public process. All other internal activities of the private Business Process are not shown in the public process. Synonymous with “Abstract Process”. [OV-6c]
Purpose	A brief statement of the reason for a model’s existence.
Receiving Operational Activity	The identity of the Operational Activity consuming the information.
Receiving Operational Node Name	Name/identifier of the Operational Node that consumes the information.
Relationship	A Relationship is an association between two Entities or between instances of the same Entity.
Relationship Cardinality	Relationship Cardinality is the number of Entity instances that can be associated with each other in a Relationship.
Relationship Cardinality Constraint	A Relationship Cardinality Constraint is a limit on the number of Entity. Instances that can be associated with each other in a Relationship.
Relationship Name	A Relationship Name or label is “a verb or verb phrase, which reflects the meaning of the Relationship expressed between the two Entities shown in the diagram on which, the name appears.”



Term	Description
Semantics	The meaning of the syntactic components of a language.
Sending Operational Activity Name	The identity of the Operational Activity producing the information.
Sending Operational Node Name	Name/identifier of Operational Node that produces the information.
Sequence Flow	Arrows that show the order that Process Steps will be performed in a process.
Standard	An agreed upon means that establishes uniform engineering and technical requirements to implement all or part of a Technical Service.
Start Event	An Event that indicates where a particular process will start. A process must have one or more Start Events. [OV-6c]
Stereotype	A graphical icon that indicates the type of Flow Object. [OV-6c]
Structural Assertion Business Rule	These rules concern mission or business CBM terms and facts that are usually captured by the Entities and Relationships of Entity-Relationship models. They reflect static aspects of Business Rules that may also be captured in the OV-7. – Terms: Entities. – Facts: Association between two or more terms (for example, relationship).
Sub-Process	A compound Process Step that is included within a process. It is compound in that it can be broken down into a finer level of detail (a process) through a set of Sub-Processes. A Sub-Process may be shown graphically as a collapsed or expanded Sub-Process. [OV-6c]
Swimlanes	Swimlanes group the primary modeling elements by organization or other criteria. There are two Swimlane objects, Pools and Lanes. [OV-6c]
Synchronization	See “Join (AND-Join)”. [OV-6c]
Syntax	Structural components or features of a language and the rules that define relationships among them.
System Data Exchange	Listed in the SV-6, it represents data exchanges between System Functions and may include additional information assurance or performance attributes to characterize the exchange. The data in the SDE is represented using data Entities and/or Data Elements within the DoDAF OV-7 architecture product.
System Entity	Shown on a SV-1, it represents computer systems, family of systems or systems of systems. A System Entity resides within a System Node and may contain one or more System Functions.
System Function	Used in the SV products, this set of organized actions produces a defined automated output when given specific data inputs. Within the context of DoDAF, a System Function transforms the data in an IE as constrained by operational and structural Business Rules.
System Interface	Shown on an SV-1, it represents the data exchange between System Entities.
System Node	Shown on an SV-1, it represents the system capabilities that are required to support the business practices that are described in the Operational View.

Term	Description
Task	An atomic Process Step that is included within a process. A Task is used when the work in the Process Step is not broken down to a finer level of process model detail. [OV-6c]
Technical Service	Listed in the TV-1 with its constituent Standards, represents a technical capability designed to support an Enterprise Sub-Service.
Technology Service Area	Shown in the TV-1, it groups similar Technical Services together for increased organization and comprehension. There may be one or more Technical Services in a Technology Service Area. The current TV-1 takes its highest-level structure from the DoD Enterprise Architecture Technical Reference Model (EA TRM). It contains four Technology Service Areas, drawn from the Core Service Areas of the DoD EA TRM.
Term	Used in the BEA or ETP, this is a word or group of words designating a selected concept.
Text	An overall textual (non-graphical) comment about an IDEF0 graphic diagram.
Text Annotation	Text Annotations are mechanisms (Artifacts), attached with an Association, for a process architect to provide additional information for the reader of the Process Diagram. [OV-6c]
Timeliness	Required maximum allowable time of exchange from Node to Node (in seconds).
Title	A verb or verb phrase that describes the overall function presented on an IDEF0 diagram; the title of a Child diagram corresponds to its Parent box name
Transaction Type	Descriptive field that identifies the type of the IE.
Triggering Event	Brief textual description of the Event(s) that trigger the IE.
Tunneled Arrow	An arrow (with special notation) that does not follow the normal requirement that each arrow on a diagram must correspond to arrows on related Parent and Child diagrams.
Uncontrolled Flow	Sequence Flow that is not affected by any conditions or does not pass through a Gateway. [OV-6c]
View	A subset of Entities, Attributes and Relationships that has meaning from a specific perspective. For example, a view can show only that portion of the data model that is relevant to a specific domain or to a macro Process Step.
Viewpoint	A brief statement of the perspective of the model.
XOR	See “Exclusive Gateway”. [OV-6c]

# Appendix D: BEP AV-1 Template

**<BEP Name (Acronym)>  
Overview and Summary Information (AV-1)  
Version 6.0, July 10, 2008**

<i>(Description of the purpose of this document)</i> The AV-1 is an executive-level summary of the DoD <BEP Name> Business Enterprise Priority (<Acronym> BEP). Initially, the AV-1 is used to focus the <Acronym> BEP development effort and document its scope. The final version will include findings and recommendations from the effort.	
<b>Architecture Project Identification</b>	
<b>BEP Name</b>	<BEP full name and acronym>
<b>BEP Description</b>	<The BEP Description. This is the authoritative source for the BEP Description in the ETP narrative and for the BEA in S.A.>
<b>Architect</b>	DoD Business Transformation Agency (BTA)
<b>Developed By</b>	<Lead Core Business Mission > <Supporting Organizations>
<b>Assumptions and Constraints</b>	The <BEP Name> BEP: <ul style="list-style-type: none"> <li>Will make maximum reuse of existing BEA products with changes only made when necessary.</li> <li>Will address only DoD enterprise-level business and strategic plans, goals, objectives, and strategies, which are the primary drivers for the BEA.</li> </ul> <Additional list of BEP specific assumptions and constraints placed on the architecture>
<b>Approval Authority</b>	The Deputy Secretary of Defense, acting through the Defense Business Systems Management Committee (DBSMC).
<b>Date Completed</b>	Architecture content freeze date, December 11, 2008 and final release date March 13, 2009.
<b>LOE and Development Costs</b>	Level of effort and projected and actual costs to develop the BEP Products may be requested from the Director, BTA.
<b>Scope: Architecture View and Products Identification</b>	
<b>Products Developed</b>	List of architecture products to be developed or updated for this deliverable.
<b>BEP Capabilities</b>	<List of Business Capabilities that are related to the BEP. This is from the BEA mappings in S.A and is used in the ETP.>
<b>Scope</b>	<Summary of BEA Improvements Proposals (BIPs) approved for development for the BEP in current deliverable.>
<b>Time Frames Addressed</b>	The BEA is the “To Be” architecture for transformation efforts at DoD. The current BEA “To Be” end state has intermediate time frames for implementation addressed in the Enterprise Transition Plan (ETP).
<b>Organizations Involved</b>	<Identify the CBMs or other stakeholders involved in the BEA development effort>

Purpose and Viewpoint	
<b>Purpose (Problems, Needs, Gaps)</b>	<i>&lt;A brief description that explains the need for the BEP content in the architecture, including significant issues, problems, needs, or gaps that this priority is intended to address or target for resolution.&gt;</i>
<b>Questions to be Answered</b>	<i>&lt;BEP specific questions that serve as discovery tools to identify required data, activities and rules aligned with the BEA Purpose and Intended Uses.&gt;</i>
<b>Architecture Viewpoint</b>	<i>&lt;The viewpoint from which the architecture is being developed.&gt;</i> <i>Sample from PV:</i> <i>"PV-BEP will be developed from a personnel management perspective focusing on using strategic plans, key DoD enterprise-level processes and information. The enterprise-level deals with business capabilities that are DoD wide as established by statute, policy, or longstanding practice and includes the systems and initiatives that support those capabilities."</i>
Context	
<b>Mission</b>	<i>&lt;A functional statement from the Core Business Mission Area as it pertains to the BEP.&gt;</i>
<b>Vision</b>	<i>&lt;A statement regarding the intended capability end state of the BEP in relation to the Core Business Mission Area. &gt;</i>
<b>Goals</b>	<i>&lt;The BEP Goals. This is the authoritative source for the BEP Goals in the ETP narrative.&gt;</i>
<b>Objectives</b>	<i>&lt;The Objectives for the BEP. This is the authoritative source for the BEP Objectives in the ETP narrative &gt;</i>
<b>Rules, Conventions, and Criteria</b>	<p><b>Rules:</b> The <i>&lt;BEP Name&gt;</i> BEP adheres to the DoD Architecture Framework (DoDAF) Version 1.5.</p> <p><b>Conventions:</b> The conventions and methodology to be followed are documented in the BEA Development Methodology and the Architecture Product Guide, as well as applicable Decision Memorandums approved by BEA Leadership.</p> <p><b>Criteria:</b> BTA establishes detailed evaluation criteria for the delivery.</p> <p><b>Information Assurance Posture:</b> The <i>&lt;BEP Name&gt;</i> BEP information confidentiality, integrity, and availability must be protected to the extent required by applicable DoD policy.</p>
<b>BEA Tasking / Linkages to Other Architectures</b>	<p><b>Tasking --</b> The 2005 National Defense Authorization Act (NDAA) requires architectures to assess and maintain investments throughout the DoD BMA.</p> <p><b>Linkages to Other Architectures</b> – BEA is linked to the Federal Enterprise Architecture (FEA) Business Reference Model through the DoD EA Reference Models and federated with Component and program architectures through tiered accountability.</p> <p><i>&lt;Additional list of architectures to which the BEP content in the BEA may be linked.&gt;</i></p>
Tools and File Formats to be Used	
Telelogic System Architect v 10.7, Merant Version Manager, Merant Tracker, Microsoft SQL Server, Word, Access, and Excel.	

Note: *Text in italics to be added by BEPs.*

# Appendix E: BEA Improvement Proposal Template

## BEA Improvement Proposal BIP Administrative Information

BIP Name	<i>Provide name of proposed BEA Improvement.</i>
BIP ID	<i>The unique identifier for this BIP. (To be filled in by EA team.)</i>
BIP Sponsors	<i>Provide name of the Government Lead(s) sponsoring the submission of this BIP. Provide names, titles, and organization. For example, CBM or BEP Team, BMA Federation Team, DBSAE, LRP, EI, or Chief Enterprise Architect.</i>
BIP Submitter	<i>Name of person / Organization managing the preparation of this BIP.</i>
IRB	<i>Name of IRB with authority over the investment decisions primarily impacted by this BEA Improvement, if any.</i>

## BEA Improvement Scope Description

BEA Improvement Description	<i>Provide a brief, narrative description that clearly identifies the proposed improvements to the BEA (scope: breadth and depth).</i>
Affected Enterprise Business Capability	<i>Identify and explain how the Enterprise Business Capabilities will be impacted by this proposed improvement.</i> <i>Identify any new or revised Business Capabilities required for this proposed improvement.</i>
Affected Enterprise Systems and Initiatives	<i>Identify the Enterprise Systems impacted by this proposed improvement. Also, identify any affected initiatives that define data standards or other controls. Identify whether new or revised enterprise systems are involved.</i>
BEA Product	<i>To the extent known, provide an overview of the BEA products that will be developed or updated for this BIP. Describe the changes that are required and all related architecture products resulting from the new, updated or deleted content.</i>

*For example, for the products used to support either the top-down or bottom-up improvements:*

- Identify all OV-5 Operational Activities impacted and describe the key changes to the activities;*
- Identify all other products (e.g., OV-2, OV-3, etc.) impacted, and describe how this BIP will impact the products;*
- Identify any new improvement for example Standardized Data Transactions; and*
- Identify any improvement such as new Data initiatives (SFIS Data Elements)*

Laws, Regulations and Policies	<i>Describe any LRP changes related to this improvement, including OV-5 controls, mapping to OV-6c process objects and derived OV-6a Business Rules, if applicable. LRP changes can be related to existing, revised or new LRPs.</i>
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## BEA Improvement Benefits Description

Problems, Needs, and Gaps Addressed	<i>Describe problems, needs or gaps that this proposed improvement addresses</i>
Reference Materials	<i>Provide identification and description of references which support the need for this BIP (e.g., initiative results, AV-1 Findings and Recommendations, GAO report, Quadrennial Defense Review (QDR). Provide links where applicable.</i>
BEA Improvement Outcome	<i>Describe the anticipated beneficial outcome(s) for specific DoD stakeholders in terms of improved:</i> <ul style="list-style-type: none"><li><i>• Alignment with BEA Purposes (Uniform Standards and Interfaces, Interoperable Solutions, Compliance)</i></li><li><i>• Alignment with BTA Focus Areas</i></li><li><i>• Transformed business operations for more efficiency and effectiveness</i></li><li><i>• Decision-making information</i></li><li><i>• Stewardship of resources</i></li><li><i>• Implementation or modification of a major system</i></li><li><i>• Implement standard or policy change</i></li><li><i>• Federation support, coordination with Component and System Architectures</i></li><li><i>• ERP Support</i></li></ul>

*(Note: What will change in the way DoD executes its business practices as a result of this BEA Improvement? This outcome can be addressed by referring to improvements in the BEA's ability to answer Golden Questions, Derived Questions, BEP/IRB Objectives or BVA Outcomes.)*

**Completion Criteria**  
*Identify the requirements that must be satisfied in the BEA to determine if the BEA content meets the objectives of this BEA Improvement.*  
*For example, for new or updated Business Capabilities, the completion criteria may be that all required Operational Activities been included on the OV-5 Node Tree to serve for future detailed refinements.*  
*For Services, if the objective was to incorporate the enterprise aspects of a service, the completion criteria may be that the service definition is included in BEA and the inputs and outputs required to use the service are included in the BEA.*

### BEA Improvement Impacts

**BEP Team Most Affected** *Identify the BEP Team that the proposed BEA Improvement affects the most. Supporting BEP Teams affected by this improvement may also be referenced.*

**CBM Most Affected** *Identify the CBM most closely related to the proposed BEA. Supporting CBMs that are affected by this improvement may also be referenced.*

**ETP/MCR<sup>11</sup> Touchpoints** *Identify any changes required to the ETP as a result of the BEA Improvement. For example, addition of Business Capability or Enterprise System.*

**BMA Coordination** *Identify other organizations in the DoD Business Mission Area with which this BEA Improvement will need to be coordinated.*

**Non BMA Coordination** *Identify other DoD Mission Areas, other federal organizations or any other organizations outside the BMA with which this BEA Improvement will need to be coordinated.*

**Risks / Dependencies** *Explain the risks of making the changes described as well as the risks of not making the changes. Identify dependencies that could pose a risk.*

**Level of Effort** *To the extent known, provide an estimate of the level of effort required to make this improvement – FTE's and hours.*

**Additional Comments** *Provide additional comments on this BIP not addressed above.*

Submission Date:

BIP Approver:

Signature:

Date:

### BEA Improvement Version History

BIP Name		Provide name of proposed BEA Improvement.	
BIP ID		The unique identifier for this BIP	
Version	Date	Description of all revisions made to the BIP.	Approver
		Describe all changes made to this approved BIP to include scope changes throughout the BEA development process.	

Green designates new field for BEA 6.0.

<sup>11</sup> This template reflects the BIP form used for BEA 6.0. Starting March 2009, the MCR is referred to as the Congressional Report

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